WASHINGTON DEPARTMENT OF FISH AND WILDLIFE SMOLT MONITORING PROGRAM - LOWER GRANITE DAM ON THE SNAKE RIVER, WASHINGTON - 1996

ANNUAL REPORT

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Summary

The 1996 fish collection season at Lower Granite was characterized by high spring flows, spill, cool spring and early summer water temperatures and comparatively low numbers of fish, particularly yearling chinook, collected and transported. A total of 5227,672 juvenile salmonids were collected at Lower Granite, the fewest since 1986. Of these. 5.117,685 were transported to release sites below Bonneville Dam, 4,990.798 by barge and 126,887 by truck. An additional 102,430 fish were bypassed back to the river, most of these being part of the National Marine Fisheries Service transportation evaluation study. New extended length submersible bar screens (ESBS) and new vertical barrier screens were installed in all units and a prototype surface collector was installed in front of units 4, 5 and 6 and operated from 23 April through 3 June. Smolt Monitoring Program and National Biologic Survey biologists examined 4,58 1 fish. collected at the separator, for symptoms of Gas Bubble Disease.

Introduction

The Northwest Power Planning Council's (NPPC) Fish and Wildlife Program established the Fish Passage Center to manage flow and spill mitigation measures as representatives of the fishery agencies and tribes. The FPC Smolt Monitoring Program (SMP) provides information needed to implement the flow and spill mitigation as well as document the migrational characteristics of the many stocks of salmon and steelhead in the Columbia Basin. Each year. SMP provide FPC with real-time information on fish passage through the system based on site-specific data from key monitoring sites FPC staff oversees and guides the sampling programs at each of the sites where monitoring takes place.

At Lower Granite Dam. smolt monitoring program personnel obtain data by inspecting subsamples of the daily smolt collection. Staff technicians and biologists identify and record for each fish sampled. species. rearing type (hatchery or wild), freeze brands, fin clips, injuries and external signs of disease and/or stress. Lengths and weights are taken on a subsample of these fish. The staff also collects daily river flow and/or spill and temperature data; monitors and assists on-site research activities of other agencies as needed; maintains accurate records of sample and collection data. transmits daily reports to the FPC and prepares an annual report

Lower Granite Dam is located on the Snake River. approximately107 5 miles upstream from its confluence with the Columbia River Lower Granite is the first of eight dams that fish in the Snake River and its tributaries encounter on their way to the ocean. It has one of four juvenile fish collection and transportation facilities operated by the Corps of Engineers on the Snake and Columbia Rivers. Fish are collected and either bypassed back to the river or transported in barges and trucks to release locations below Bonneville Dam on the Columbia

River Conditions

River flows during April, May and June in 1996 were much higher than the previous four year average (Table 1). The season began with much higher flows than normal in late March and April. River flow past Lower Granite the last few days of March was near 90 kcfs. Flows first topped 100 kcfs on April 10 and peaked twice in April at 155.7 kcfs and 160 l kcfs on 13 and 25April. respectively, before subsiding somewhat in early May By 14 May flows again topped 100 kcfs and peaked again at 202.8 kcfs on 19 May. The final, and largest, daily flow peak of the season was 203.5 kcfs on 11 June. After this, flows subsided steadily, dropping under 100 kcfs by 24 June and reaching 50 kcfs on 11 July. Flows remained above 30 kcfs until I September when flow from Dworshak reservoir was curtailed. Daily average flows topped 100 kcfs on 60 days and were above 85 kcfs an additional 28 days. Flows were below SC kcfs for only 8 days during April, May and June.

Spill occurred at Lower Granite during much of the spring outmigration Very little water was spilled during the few collection days at the end of March April I and 2 saw spill for several hours each day Beginning on 3 April. spill was nearly continuous until 28 June. Spill for fish passage only, occurred primarily. during late April and early May, when flows were below 100 kcfs. This voluntary spill was limited to 35 kcfs to control dissolved gas levels below Lower Granite. Voluntary spill occurred between 0000 and 1200 hours. This was a change from previous years. when spill for fish passage was done between 1800 and 0600 hours. This change was to accommodate testing of the surface collector. A mixture of voluntary and involuntary spill took place during mid-April. late May and much of June The peak daily average spill was 1 12 2 kcfs on I3 April when several units were out of service for the installation of the surface collector Also contributing to higher spill levels in May and June was a restriction placed on the turbine units because of problems with the perforated plates on the ESBS's

Surface collector discharge through spillbay 1. along with accompanying discharge from spillbay 2. occurred nearly continuously when the surface collector was in operation fi-om 24 April to 3 June This discharge was generally between 1 3 and 6 2 kcfs and was only shut off when gate settings on the surface collector were being changed

Water temperatures were also favorable for much of the 1996 collection season The water temperature when the facility was watered up on 27 March was 45° F The temperature reached 50" F on 9 April and remained very close to that until 23 May when a gradual increase in temperature began The temperature rose to 55° F on 7 June. 60" F on 27 June, 65" F on S July and 70" F on 23 July The maximum temperature for the season was 72" F on 3 1 July (one day). Temperatures declined several degrees in late August due to cold water releases from Dworshak reservoir, and then declined further as air temperatures decreased into September and October. ending the season at 53° F on 3 1 October

Debris levels in the river and at the fish facility were very high throughout most of the season. Late winter and early spring high flows brought much debris down to Lower Granite. Several sections of the trash shear boom were mis-aligned or swinging freely at one end and allowed more than the usual amount of trash to accumulate in front of the powerhouse, particularly in July and August.

Table 1: Comparison of average monthly flow and spill at Lower Granite Dam, 1992-1996.

Month	1992	1993	1994	1995	1996	1992-1995 Average
			Flow (kcfs)			
Apr	39.6	63.9	51.0	60.1	112.6	53.6
May	60.3	130.5	77.5	107.9	126.2	94.0
Jun	30.3	100.4	39.3	115.6	146.2	71.4
Jul	24.8	50.7	39.4	62.0	55.4	44.2
Aug	13.1	33.4	13.0	37.4	37.6	24.2
Sep	16.5	20.5	13.4	27.4	25.0	19.4
Oct	16.4	23.6	17.5	28.0	22.2	21.4
			Spill (kcfs)			
Apr	0.0	0.0	0.0	0.0	47.0	0.0
May	0.0	26.1	15.7	18.4	47.0	15.0
Jun	0.0	1.2	7.9	9.3	52.6	4.6
Jul	0.0	0.0	0.0	0.0	3.4	0.0
Aug	0.0	0.0	0.0	0.0	0.1*	0.0
Sep	0.0	0.0	0.0	0.0	0.0	0.0
Oct	0.0	0.0	0.0	0.0	0.0	0.0

*Spill due to isolated episodes at BPA's request.

Fish Collection

Migration and Collection

The juvenile fish bypass gallery was initially watered up on 7 March. Fish were bypassed through the 42-inch pipe (primary bypass) until 27 March, when the separator was watered up and fish collection for transportation began. Fish collection and transportation numbers were substantially below those of the past several years (Table 2). Hatchery and wild yearling chinook collection numbers exhibited the most dramatic declines, although hatchery and wild steelhead collection numbers were also less than the average for the past four years. Some of this decline can be attributed to high spill at Lower Granite, and also to the operation of the experimental surface bypass collector, but yearling chinook migrants were expected to be very low this year.

All of the 17,346 subyearling chinook shown in Table 2 are wild fish. There were hatchery fish in the system, but they were all PIT tagged and were, therefore, theoretically

all diverted by the PIT tag diversion system. These fish were from Lyon's Ferry Hatchery and were not adipose-clipped. There were instances of PIT tagged hatchery subyearling chinook found in the sample but these were returned to the river and not counted at the request of the Fish Passage Center. PIT tag database records show that 719 PIT tagged hatchery subyearling chinook went to the raceways, 9,633 were automatically diverted back to the river, 509 were sent to the sample and 61 went to an unknown destination.

Coho smolts passed Lower Granite in substantial numbers for the first time in several years. Wild coho are extinct in the Snake River A Nez Perce tribal hatchery released 630,000 pre-smolts in the summer of 1995 An estimated 19,028 coho smolts were collected at Lower Granite in 1996.

There were three peaks in fish collection in 1996; late April. early May and middle May. The first and last of these corresponded to river flow peaks (Figure 1 and Appendix Table 1). There were 21 days in which collection exceeded 100,000 fish, 5 days over 200,000, 2 days over 300.000 and only 1 day with total fish collection over 400,000 Peak collection days were somewhat unusual in 1996 (Table 3). The hatchery steelhead and total fish peaks were earlier than usual. while the hatchery. yearling chinook peak was later than normal (Figures 1. 2.5) The wild steelhead collection pattern was similar to hatchery steelhead (Figure 6) Wild yearling chinook peaked much earlier than their hatchery counterparts. with collection falling to zero on one day between peak collection periods (Figure 5) A few subyearling chinook were seen in the sample in April and May, but did not appear on a regular basis until the middle of June. They peaked in mid-July. and then maintained fairly strong numbers until mid-August (Figure 4) A single hatchery sockeye was seen in the sample on the first day of collection and none were seen after that point until 15 May. Their collection peaked shortly afterwards, with sporadic collection numbers in the following days (Figure 8). Peak collection days generally had fewer fish collected than in recent years The exception to this was sockeye kokanee with a greater peak one dav collection than in recent years Most of these fish were likely kokanee flushed out of Dworshak reservoir early in the season (Figure 8) Coho were not identified in the collection until 2 May, and not regularly seen until after I6 May (Figure 9) The peak day for coho collection was 19 May, when 1,650 were collected

Table 2: Annual collection, bypass, and transport at Lower Granite Dam, 1992-1996

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Sub-Yr. Chinook	Hatchery Steelhead	Wild Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total*
Collection								
1992	2,496,805		6,054	3,824,113	582,499		1,703	6,911,174
1993	1,442,819	339,349	16,469	5,722,730	500,906		3,348	8,025,621
1994	1,862,390	316,939	6,769	4,223,477	477,925		23,201	6,910,701
1995	2,991,449	789,070	31,019	5,501,552	414,082		6,325	9,733,497
1996	462,995	126,895	17,346	4,264,688	321,821	5,137	9,762	5,227,672
Bypass								
1992	15,249		0	92,127	12,171		25	119,572
1993	74,413	5,451	0	329,406	28,560		0	437,830
1994	14,618	555	3	39,487	2,384		105	57,152
1995	222,928	53,260	1,590	368,705	22,014		105	668,602
1996	49,978	19,332	358	30,883	977	107	30	102,430
Truck								
1992	59,298		1,893	109,337	11,727		250	182,505
1993	4,798	9,852	16,018	40,601	3,694		605	75,568
1994	8,791	26,858	6,628	93,048	13,570		1,884	150,779
1995	37,526	89,658	28,068	71,430	13,389		3,094	243,165
1996	2,207	4,004	15,857	82,108	12,802	889	6,054	126,887
Barge								
1992	2,406,622		4,118	3,612,513	558,228		1,417	6,582,898
1993	1,356,565	322,921	245	5,351,354	468,544		2,651	7,502,280
1994	1,831,163	288,328	97	4,085,149	461,715		20,524	6,686,976
1995	2,722,029	644,226	787	5,059,422	378,619		3,051	8,808,134
1996	407,960	102,368	885	4,149,222	307,805	4,120	3,184	4,990,798
Total Transported								
1992	2,465,920		6,011	3,721,850	569,955		1,667	6,765,403
1993	1,361,363	332,773	16,263	5,391,955	472,238		3,256	7,577,848
1994	1,839,954	315,186	6,725	4,178,197	475,285		22,408	6,837,755
1995	2,759,555	733,884	28,855	5,130,852	392,008		6,145	9,051,299
1996	410,167	106,372	16,742	4,231,330	320,607	5,009	9,238	5,117,685

*1996 totals include coho.

Table 3: Annual peak collection days at Lower Granite Dam, 1992-1996

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wild Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
1992	May 1 (235,316)		June 26 (746)	May 5 (369,267)	May 3 (41,651)		May 11 (180)	May 5 (464,253)
1993	May 7 (126,195)	April 30 (24,698)	July 19 (599)	May 7 (703,941)	May 7 (53,765)		May 26 (201)	May 7 (893,100)
1994	May 10 (137,577)	April 24 (27,097)	July 9 (470)	May 10 (353,101)	April 24 (39,698)		May 12 (2,411)	May 10 (514,500)
1995	May 2 (288,000)	May 3 (30,600)	July 28 (1,170)	May 3 (654,000)	May 10 (34,050)		July 6 (430)	May 3 (910,051)
1996	May 14 (31,350)	April 21 (9,000)	July 13 (1,004)	April 27 (366,900)	April 27 (22,350)	May 17 (750)	April 2 (910)	April 27 (407,550)

Figure 1. Daily juvenile salmonid collection, all species combined. versus daily average river flow at Lower Granite Dam. 1996.

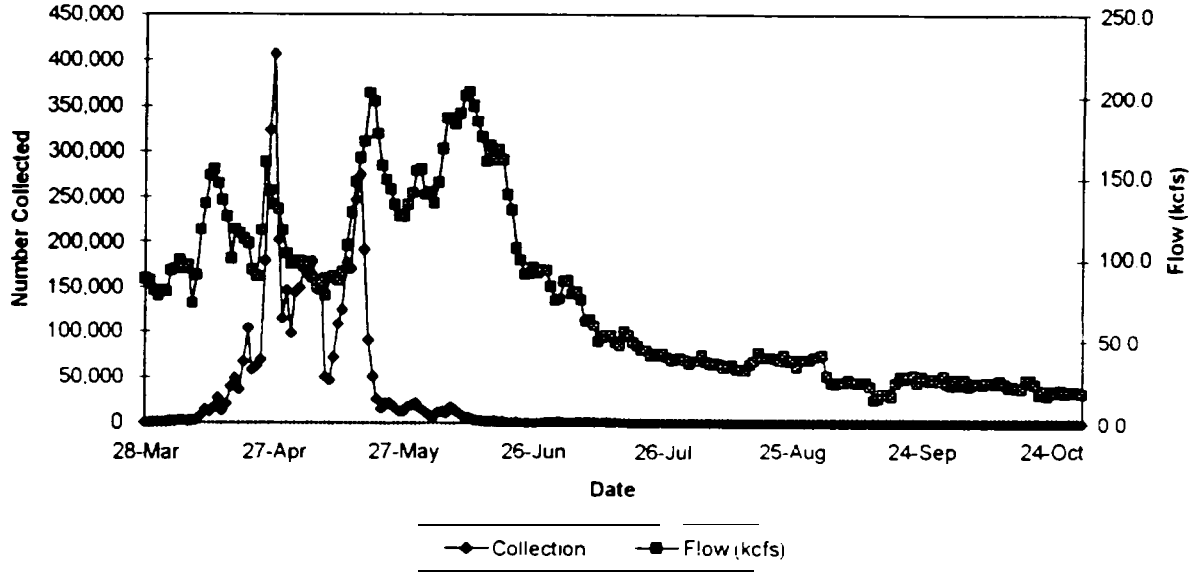


Figure 2. Daily hatchery yearling chinook collection versus daily average river flow at Lower Granite Dam. 1996

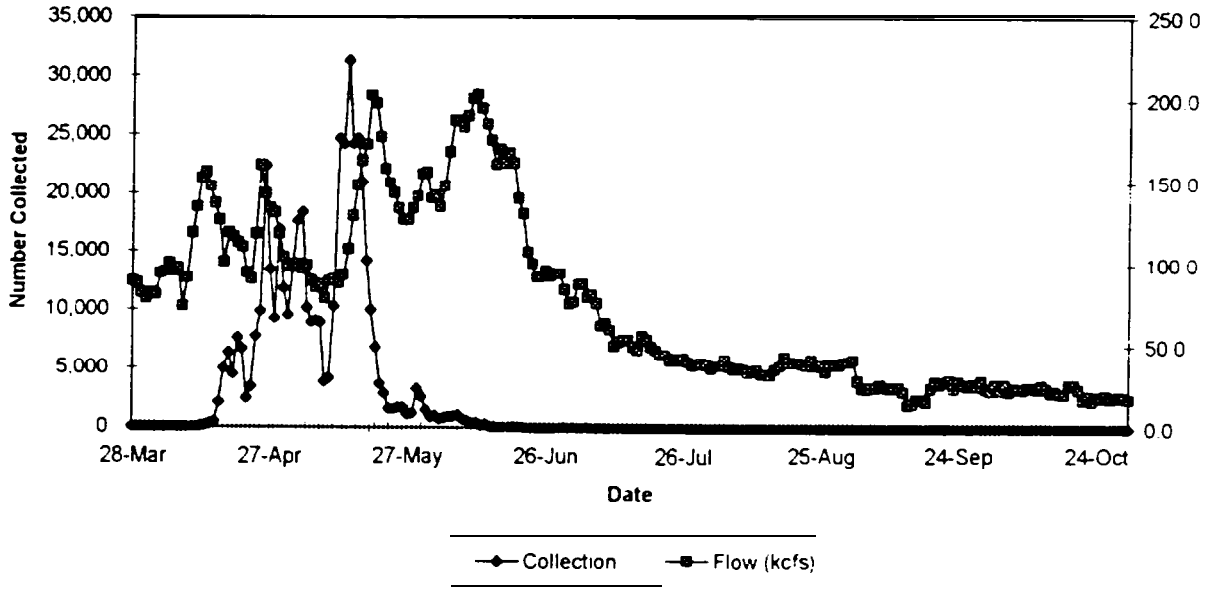


Figure 3. Daily wild yearling chinook collection versus daily average river flow at Lower Granite Dam, 1996.

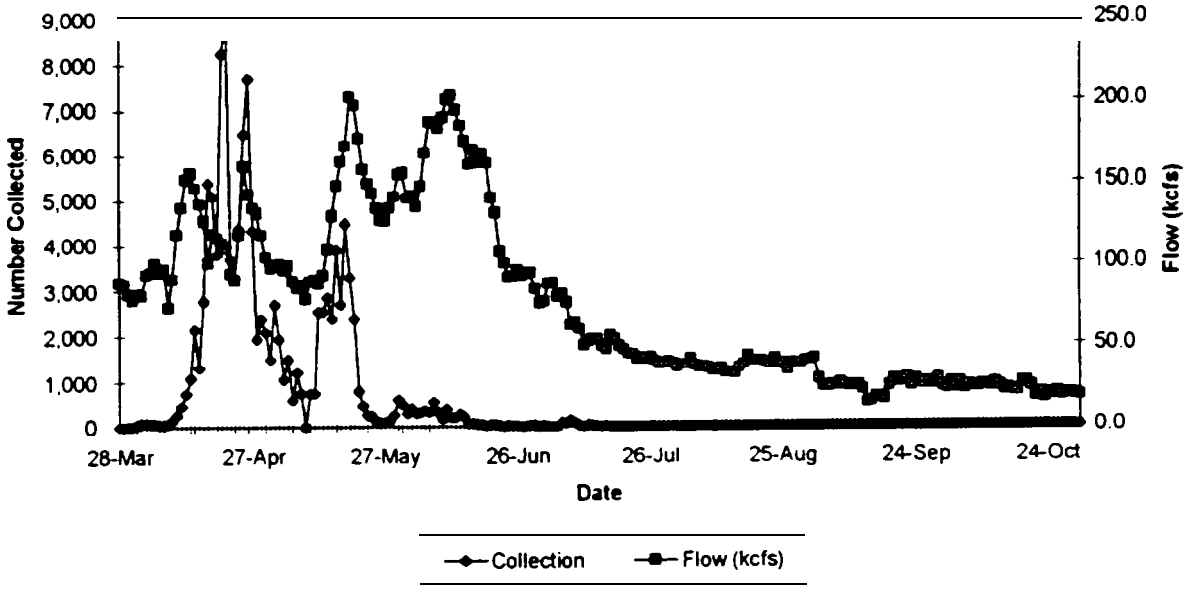


Figure 4. Daily subyearling chinook collection versus daily average river flow at Lower Granite Dam, 1996.

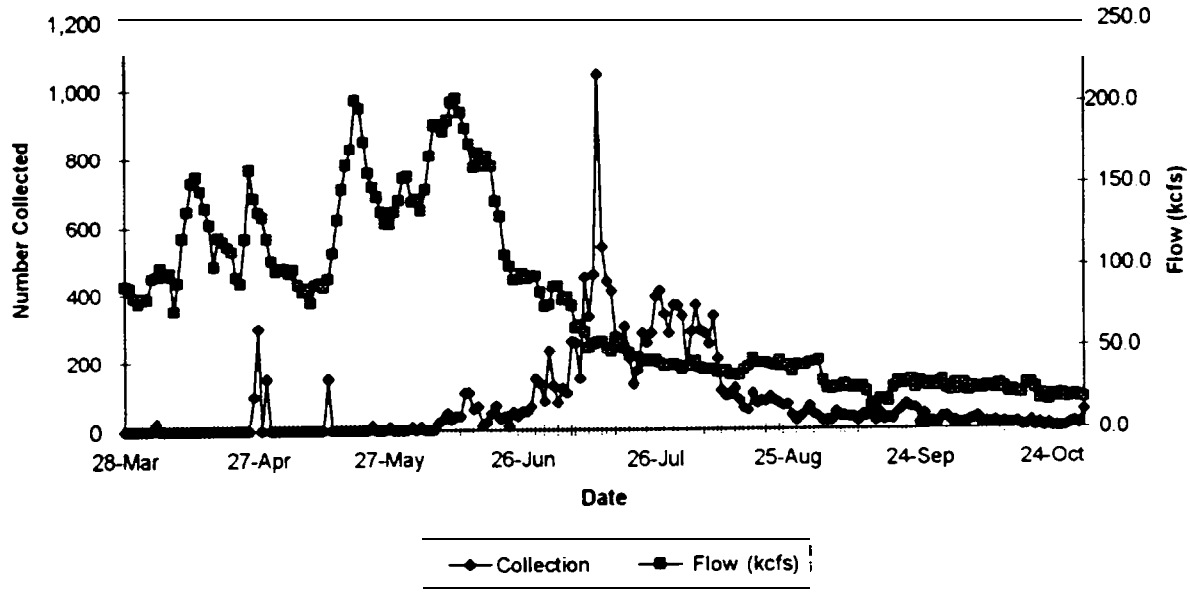


Figure 5. Daily hatchery steelhead collection versus daily average river flow at Lower

Granite Dam, 1996.

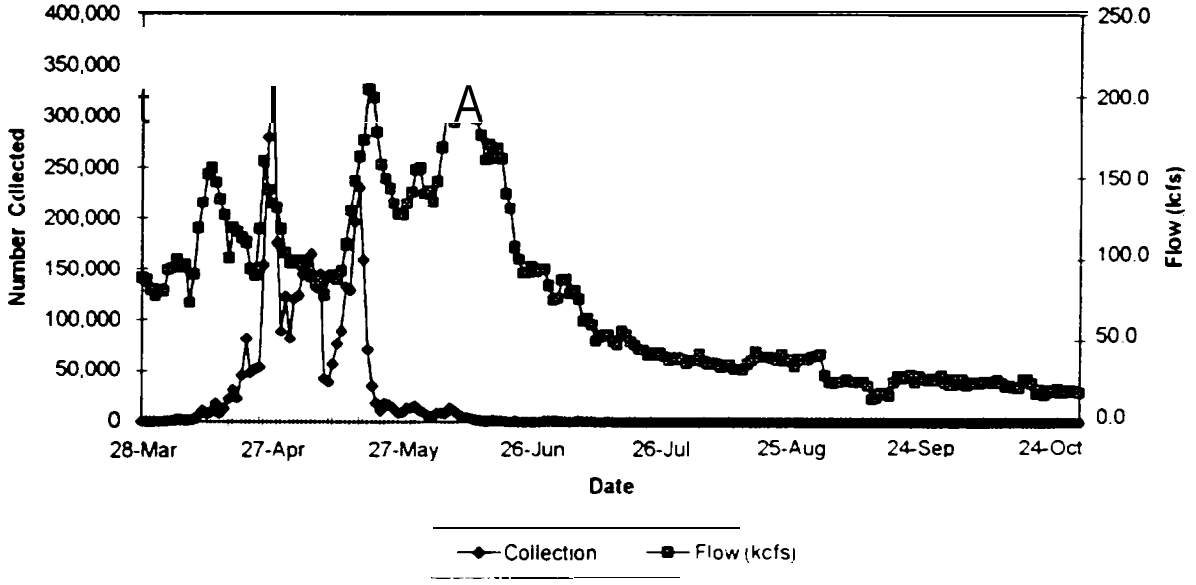


Figure 6. Daily wild steelhead collection versus daily average river flow at Lower Granite Dam, 1996.

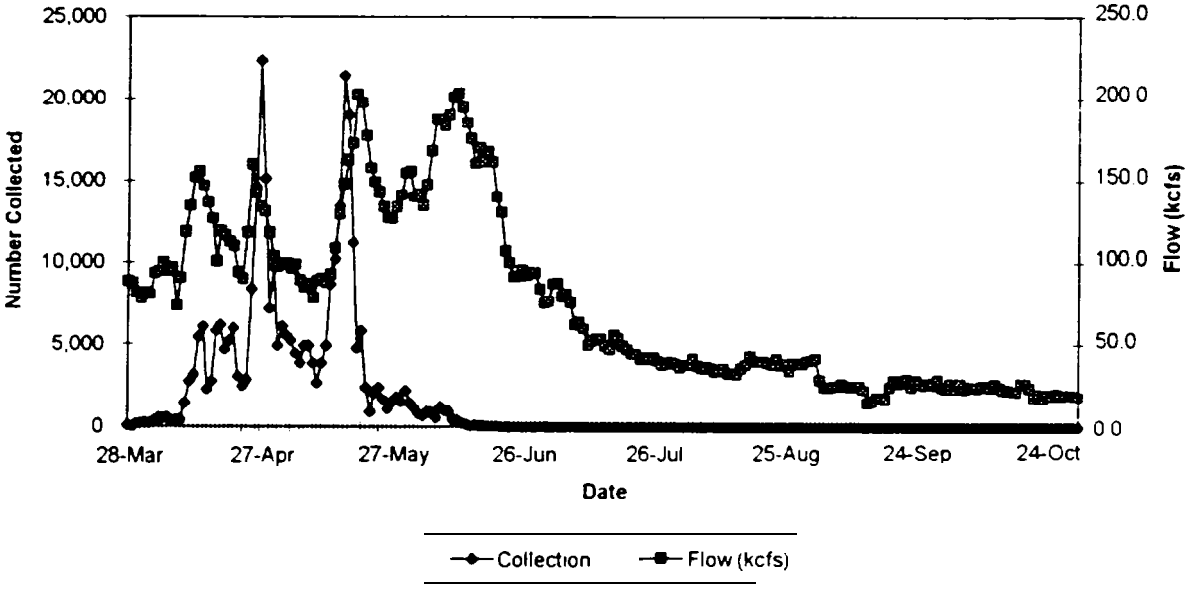


Figure 7. Daily hatchery sockeye/kokanee collection versus daily average river flow at

Lower Granite Dam, 1996.

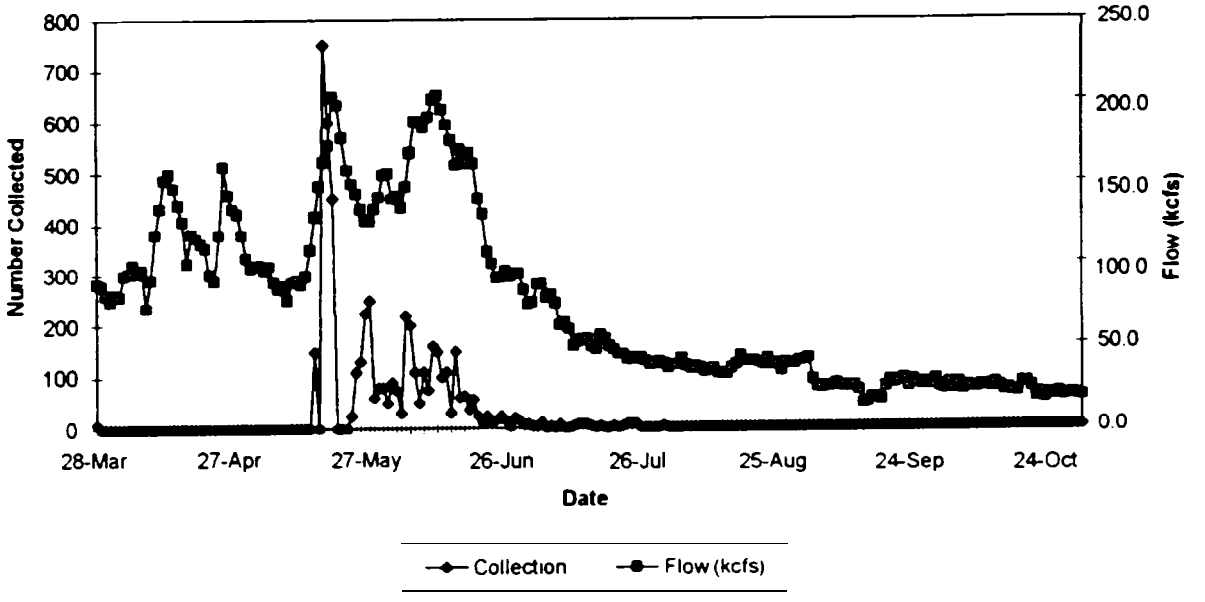


Figure 8. Daily wild sockeye/kokanee collection versus daily average river flow at Lower Granite Dam, 1996.

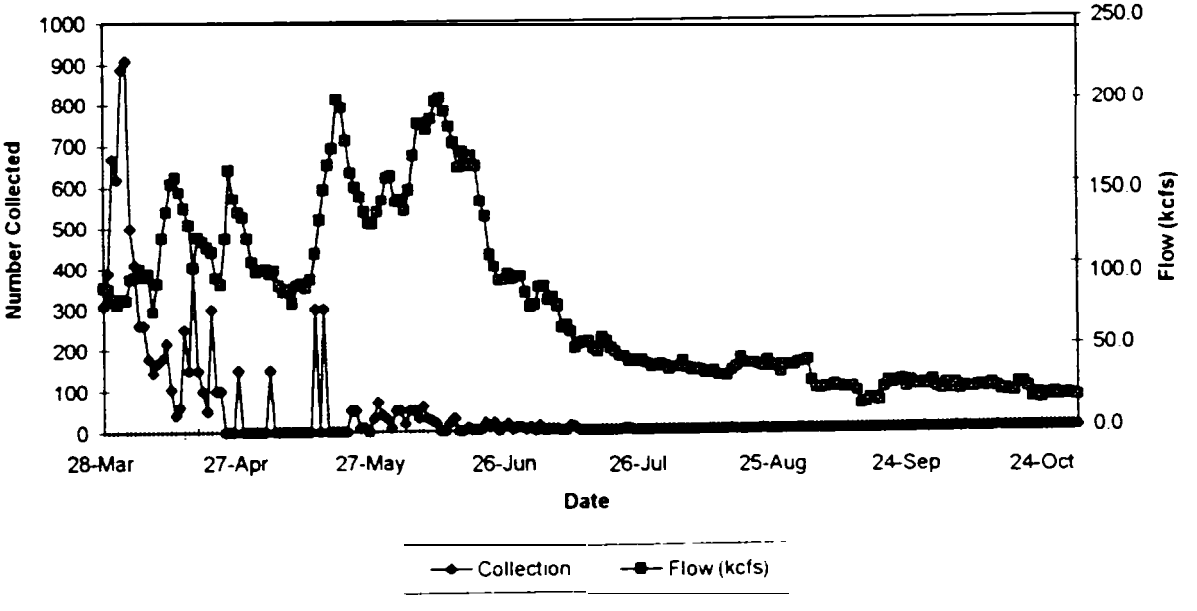
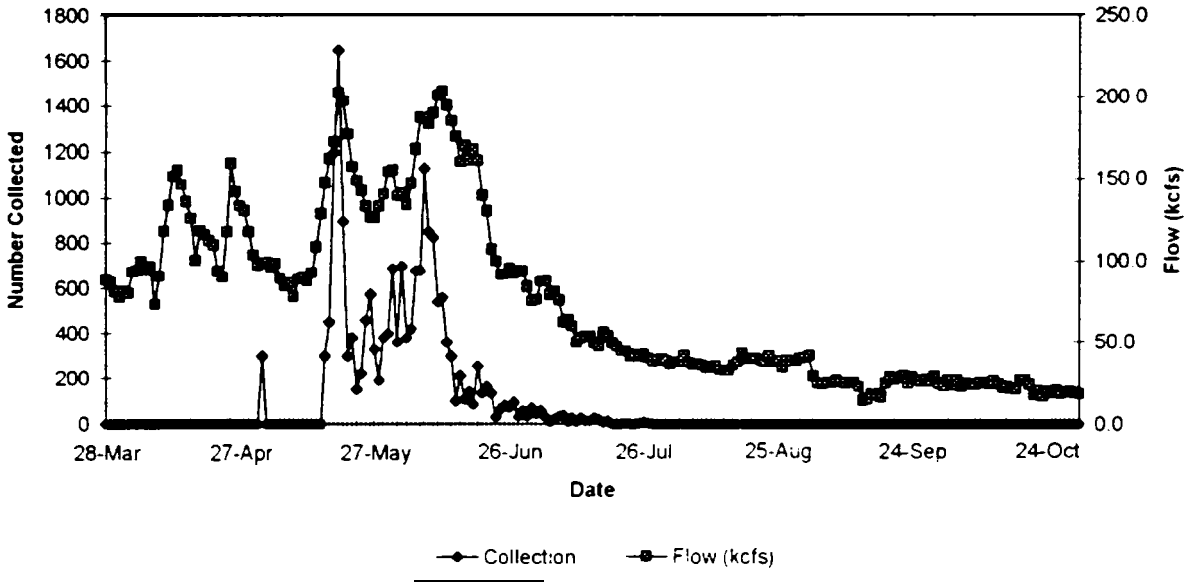


Figure 9. Daily coho collection versus daily average river flow at Lower Granite Dam,

1996



Transportation

As in the past several years, the transport season began with trucks, switched to barges as fish numbers increased and then back to trucks when fish numbers declined The first truck left Lower Granite on 29 March. Subsequent trucks left every other day through 12 April. The first barge departed Lower Granite on 14 April and continued every other day through 22 April. Barges left every day from 24 April through 26 May, and then every other day through 11 June when the last barge of the season left Lower Granite. Trucking resumed on 13 June and continued every other day until the last truck of the season departed on October 31 The only exception to this schedule was 5 July. when malfunctioning brakes on a fish hauling trailer caused the cancellation of that day's trip. The 3,500-gallon trailers were used during the early season trucking phase and also in the late season trucking phase up to 12 August, when the 150-gallon pickup-mounted mini-tanker was brought into use for the rest of the season.

The majority of the transported fish were transported in barges (Table 2) The exceptions to this were subyearling chinook, which tend to arrive at Lower Granite mostly after the barging season is over and wild sockcyc/kokanee Most of the wild sockeye/kokanee which were trucked during the early season phase were thought to be kokanee from Dworshak reservoir. as they were spilling large amounts of water from Dworshak during this time period.

Bypass

Primary bypass (direct to river) was initiated at Lower Granite on 7 March and continued until 0800 on 27 March when collection began. The system was also in primary bypass mode for 1 hour on 13 May and 19 June to clean the separator, and about 20 to 30 minutes on 13 May, 17 June and twice on 2 l June to clean the inclined dewater screen. At 0700 on 3 1 October, the system was again placed in primary bypass when collection for the season ended. This continued until 19 December when the entire bypass system was shut down for the season. No estimate of numbers of fish was made during periods of primary bypass.

The PIT tag bypass system was operated to bypass all PIT-tagged fish, except those in the sample. from 27 March until I4 June (standard operation mode). From 14 June until 3 l October. the system was set to divert all PIT tagged fish. including those that passed through during samples. When the sample system was switched to 100% sample. the system continued to divert all PIT-tagged fish back to the river. PIT tag database records indicate that the Lower Granite PIT tag diversion system successfully returned to the river about 90% (4S,261) of the fish that passed through it. This total includes I5, 183 hatchery yearling chinook. l .932 wild yearling chinook; 9.633 hatchery subyearling chinook; 13, 108 hatchery steelhead; 1,868 wild steelhead; 500 hatchery sockeye/kokanee; 17 wild sockeye/kokanee; 2,546 chinook and I5 steelhead of unknown origin and/or age: Seven percent (3,659) of the PIT tagged fish were diverted to a raceway or directly onto a barge, 2% (1 ,329) were routed to the sample and 1% (542) had an unknown fate. An unknown number of untagged fish were also bypassed by the PIT tag diversion system.

There were two incidents that prompted fish to be released back to the river after they had been loaded into a raceway The first of these occurred on S June The barge loading line from raceway 4 developed a clog that could not be cleared with the raceways full. The tailscreen was removed from the raceway and fish were flushed out the tailrace drain line back to the river. An estimated total of 12.662 fish were bypassed at this time, nearly 80% of which were hatchery steelhead. The second incident occurred on 5 July. A fish truck had been loaded and was ready to leave when the driver discovered that the trailer breaks were not functioning correctly. The fish on the truck were released at Illia Landing, about 3 miles below Lower Granite. An estimated 1,924 fish were bypassed due to this incident, most of which were hatchery steelhead

There were four research projects at Lower Granite in 1996 that bypassed fish back to the river The NMFS marked fish for the transport evaluation research and bypassed 49,2 14 hatchery yearling chinook and 19.039 wild yearling chinook The NMFS also marked and released 15,023 hatchery steelhead for evaluation of the surface collector Some of these fish were released in the surface collector and some in the Lower Granite tailrace. The NMFS PIT tagged 3,020 hatchery steelhead and transported them to Little Goose. These fish were exposed to controlled levels of dissolved gas and then released into the Little Goose forebay Although some of them were eventually transported from the Little Goose Juvenile Fish Facility. all of them were recorded as bypassed Finally, the

National Biological Service radio-tagged 132 wild subyearling chinook and released them into the Lower Granite tailrace.

Starting on 1 1 August and continuing through the end of the collection season, all steelhead were returned to the river to reduce densities for chinook in the mini-tanker. These steelhead were directed from the lab through the sample direct load line off the end of the barge dock. A total of 1.332 hatchery steelhead and 104 wild steelhead were bypassed in this manner In past seasons. it has sometimes been necessary to bypass fish during peak collection periods because all available barge and raceway space has been filled. This did not happen in 1996 and no fish were bypassed due to lack of space at the facility or in transport barges

A summary of daily and total bypassed fish can be found in Appendix Table 2. These numbers include fish bypassed from the raceways. fish bypassed due to research projects and steelhead bypassed to reduce densities in the mini-tanker They do not include fish bypassed during periods of primary bypass or PIT tagged or incidental fish bypassed by the PIT tag diversion system.

Sample

Sampling summary

A total of 101,822 fish, 1.2% of the total collection. were sampled in 1996. The total number of fish sampled by species is as follows: 6.769 hatchery yearling chinook; 3,168 wild yearling chinook; 6.685 subyearling chinook: 74,052 hatchery steelhead; 8,235 wild steelhead: 378 hatchery sockeyeikokanee; 94-t wild sockeye/kokanee and 1.59 1 coho. This year. no hatchery subyearling chinook were recorded in the daily samples. Un-clipped hatchery subyearling chinook from Lyons Ferry were released above Lower Granite Dam but were assumed to have been bypassed as the were all PIT-tagged. (See the Bypass section earlier in this report for bypass totals of PIT-tagged fish). Hatchery coho were added to this years list of collected species. Coho were not observed in last year's sample. The coho observe this year were a result of stocking efforts conducted by the Nez Perce Tribe who released approximately 630,000 fry in tributaries of the Clearwater River in the spring of 1995.

We sampled approximately 15 % fewer smolts in 1996 than in 1995 (Table 4). This year, the contribution to the total sample of hatchery and wild steelhead and sockeye/kokanee increased from 1995. The percentages of hatchery and wild yearling and subyearling chinook in the sample decreased from 1995. In 1995 hatchery steelhead represented 47.3% of all sampled fish. This year. that number increased to 72.7%. Similarly, wild steelhead increased from 4.5% of the sample in 1995 to 8.1% in 1996 and sockeye/kokanee increased from 0.5% to 1.3%. Hatchery yearling chinook, wild yearling chinook and subyearling chinook decreased from 24.7%, 15.6%

and 7.4% of the collection in 1995 to 8.9%, 2.4% and 6.6% of the collection in 1996, respectively.

Sampling began at Lower Granite at 0700 on 28 March and continued daily until 9 August when the sample rate went to 100% and every other day sample processing was done until 31 October. A total of 2 18 daily samples were processed during this time. The sample rate was at 10% for the first 11 days of the season between 28 March and 7 April. Between 8 April and 14 April the sample rate was elevated to 25 % , and then lowered to 5 %, to provide National Marine Fisheries Service (NMFS) researchers with fish from the sample for the transportation evaluation study. The NMFS operation moved to the east raceways on 15 April and the sample rate was reduced to 1% by 22 April where it remained until 26 April. Between 27 April and 21 May. a total of 23 days, the sample rate was 0.67%. On 21 May, NMFS researchers returned to the sample room for fish marking until 17 June. To facilitate NMFS marking in the sample room, the sample rate was elevated to 10% for that time period, and resulted in substantially increased numbers of fish being sampled in late May and early June (Table 5). The sample rate was set at 25 % on 17 June and remained there for 54 days until 9 August when it was increased to 100% and remained there for 84 days until 31 October.

Additional tish sampled as a result of NMFS marking activities in the sample were tallied for Endangered Species Act (ESA) permit purposes. The NMFS PIT-tagged fish in the sample room from 8 April to 12 April and 21 May to 17 June. Collection numbers were too low to warrant diverting fish into a raceway for marking at these times. The NMFS share of the sample totals for these periods are as follows: hatchery yearling chinook, 1,463; wild yearling chinook, 476; wild subyearling chinook, 7; hatchery steelhead. 14,643; wild steelhead, 2,110: hatchery sockeye/kokanee. 96 and wild sockeye/kokanee. 106: total. 19,360 fish. This accounts for 19% of the sampled fish for the season.

Table 4. Annual percentage of total juvenile salmonids collected that were sampled at Lower Granite Dam. 1992-1996.

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steclhead	Wild Steclhead	Hatchery Sockcy e/ Kokanee	Wild Sockeye/ Koknnee	Total
1992		3.9	1 6 .6	3.7	3 .6		7.6	3.8
1993	2.8	1 .6	72 3	15 1	2 0		I.8	1.9
1994	1.4	3.5	36 .9	2.1	2.2		6.3	2.0
1995	I.0	2.4	28.7	1.0	I.3		9.8	I.2
1996	I.5	2.5	38.5	I.7	2.6	7.4	9.7	1.9*

*Percentage includes hatchery coho that were sampled in 1996 but not in previous years.

Table 5. \Veekly sample rates in percent and sample totals at Lower Granite Dam, 1996.

Week Ending	Weekly Smpl Rate (%)	Hatchery Yearling Chinook	Wild Yearling Chinook	Sub-Yr Chinook	Hatchery Steelhead	Wild Steelhend	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Totals*
Apr 4	10.0	5	37	2	323	185	1	470	1,023
Apr 11	17.5	32	267	0	6,087	1,391	0	247	8,024
Apr 18	5.3	480	805	0	5,732	1,898	0	61	8,976
Apr 25	1.7	614	600	0	6,146	488	0	11	7,859
May 2	0.7	723	177	4	9,203	583	0	1	10,693
May 9	0.7	516	47	0	6,027	220	0	1	6,811
May 16	0.7	960	105	1	4,823	436	1	4	6,332
May 23	1.2	808	168	1	6,168	586	14	7	7,827
May 30	9.4	1,254	153	1	8,832	1,153	80	19	11,713
Jun 6	9.3	649	228	2	5,697	581	73	23	7,602
Jun 13	9.0	352	205	29	4,413	373	71	14	5,864
Jun 20	18.0	120	77	64	2,018	95	69	8	2,648
Jun 27	25.0	53	43	71	1,160	34	27	19	1,571
Jul 4	25.0	87	38	219	2,103	24	18	10	2,585
Jul 11	25.0	53	111	418	1,782	39	4	8	2,456
Jul 18	25.0	31	34	851	929	18	8	0	1,904
Jul 25	25.0	13	13	410	480	3	8	2	931
Aug 1	25.0	8	12	623	388	10	1	0	1,045
Aug 8	25.0	3	9	502	220	6	0	0	740
Aug 15	100	5	5	796	568	20	2	4	1,400
Aug 22	100	0	4	585	446	12	0	3	1,050
Aug 29	100	2	1	374	270	12	0	3	662
Sep 5	100	0	7	273	135	17	1	6	439
Sep 12	100	0	1	249	33	2	0	2	287
Sep 19	100	1	3	273	16	7	0	0	302
Sep 26	100	0	10	339	24	5	0	4	383
Oct 3	100	0	2	167	11	6	0	3	190
Oct 10	100	0	3	150	4	5	0	7	172
Oct 17	100	0	0	105	3	4	0	5	117
Oct 24	100	0	1	69	4	6	0	1	82
Oct 31	100	0	2	107	7	16	0	1	134
Total Sampled		6,769	3,168	6,685	74,052	8,235	378	944	101,822
% of Sample		6.6	3.1	6.6	72.7	8.1	<0.1	<0.1	100
% of Collection		8.9	2.4	0.3	81.6	6.1	<0.1	0.2	1.9%

*Totals include 1.591 hatchery coho, which accounted for 16% of the sample.

Incidental species

This year, 11,776 incidental fish were sampled compared to 28,505 in 1995 (Table 6). We sampled approximately 75% of this season's incidental fish prior to 9 August when the facility went to a 100 % sample rate. In contrast, 60% of last year's incidentals were counted prior to 13 August when the facility went to a 100% sample rate. Crappie represented the majority of incidentals sampled with 5,603, or 47.6% of the total tallied this year. Peamouths accounted for 1,929 (16.4%), whitefish 1,479 (12.6%), chiselmouth 735 (6.2%), and suckers 588 (5.0%). The majority of juvenile lamprey in the sample were seen prior to August and accounted for 813 (6.9%) of the incidental fish. These sample numbers were expanded according to sampling time percentages.

Table 6. Estimated collection of incidental fish species at Lower Granite Dam, 1992-1996.

Common Name	Scientific Name	1992	1993	1994	1995	1996
Smallmouth bass	*Micropterus dolomieui*	1,098	2,194	263	978	423
Bluegill	*Lepomis macrochirus*	130	77	72	21	179
Bullhead (misc.)	*Amierus* sp.	72	69	20	136	100
Common carp	*Cyprinus carpio*	31	57	22	2	24
Channel catfish	*Ictalurus punctatus*	224	127	316	365	208
Chiselmouth	*Acrocheilus alutaceus*	48	1,097	87	971	3,209
Crappie	*Promoxis annularis*	434	1,274	446	155,111	22,834
Crayfish	*Cambarus sp.*	3	11	2	1	2
Pacific lamprey (eyed)*	*E. tridentatus*				714	1,896
Pacific lamprey (non-eyed)	*E. tridentatus*				1,896	5,479
Pacific lamprey**	*E. tridentatus*	111	1,218	409		20
Longnose dace	*Rhinichthys cataractae*					193
Peamouth	*Mylocheilus caurinus*	249	1,588	456	3,761	5,487
Perch	*Percinae sp.*		27	22	452	15
Pumpkinseed	*Lepomis gibbosus*	242	374	157	701	108
Redside shiner	*Richardsonius balteatus*	1	100		4	5
Sculpin	*Cottus* sp.	3	18	60	44	157
Shad (adult)	*A. sapidissima*	95	31	58	10	20
Squawfish	*Ptychocheilus oregonensis*	15	189	70	326	662
Sucker (misc.)	*Catostomus* sp.	504	2,228	3,146	2,481	1,957
Mountain whitefish	*Prosopium williamsoni*	21	1,374	959	5,139	5,247
Total		3,280	12,057	6,563	173,164	48,226

* Lamprey have two life stages, ammocoete (larval) and adult. Adult lamprey have a well toothed oral disc and fully developed eyes, while ammocoetes lack dentition and developed eyes.

** Eyed and non-eyed lamprey not distinguished prior to 1995.

Fish Condition

Descaling

The combined descaling rate for all groups in 1996 was 5.8 % , an increase from 5.0 % in 1995 (Table 7). Descaling for wild subyearling chinook increased to 9.3% compared to 5.3% in 1995. Wild sockeye/kokanee had the largest decrease in descaling rates, from 30. I % to 18.4%. Hatchery steelhead descaling decreased from 7.7 % to 6.3 %. Descaling for hatchery yearling chinook increased from 2.7 % to 3.0 %. Wild steelhead increased slightly from 1 .O% to 1.1%. Wild yearling chinook increased from 0.9% to 1.5 % . Descaling for hatchery sockeye was 3.8% or 14 out of 366. New to the Snake River system this year were hatchery coho released by the Nez Perce Tribe during the summer of 1995. Descaling was 2.4% and this rate was included in the total descaling column for all species combined in Table 12.

Weekly average descaling rates for all groups were recorded from the beginning of the collection season through the month of October (Table 8). Weekly descaling rates were 4% or less for chinook and steelhead up to the week ending 16 May. The highest weekly average descaling rates for hatchery yearling chinook (3.9%) and hatchery steelhead (16.2%) during weeks when we sampled more than 100 fish occurred in the weeks ending 16 May and 23 May. Wild yearling chinook descaling rates peaked at 2.4% in the week ending 23 May. Wild steelhead peaked at 1.6% in the week ending 16 May. Wild sockeye/kokanee consistently had the highest weekly descaling rates throughout the season and only the first two weeks of the collection season did we sample more than 100 fish in a week. Weekly average descaling rates for wild sockeye/kokanee often fluctuated between 18% to 34%.

Table 7. Annual descaling rates in percent for fish sampled at Lower Granite Dam. 1992-1996.

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wtld Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
1992		4.9		6.8	2.6		2.3	5 1
1993	4.5	3.9	4.2	6 3	1 .7		[illegible]	4.6
1994	3.7	3.6	2.1	5.4	2.0		12.5	4.3
1995	2.7	0.9	5.4	7.7	1 0		28 1	5 0
1996	3.0	1.5	9.3	6.3	1.1	3.8	18.4	5.8*

*Total includes some hatchery coho.

Table 8. Weekly descaling rates in percent for fish sampled at Lower Granite Dam, 1996.

Week Ending	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wild Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
Apr 4	*0.0	*0.0	*0.0	0.9	1.7	...	18.3	8.6
Apr 11	*3.1	0.0	...	0.9	1.3	...	16.7	1.4
Apr 18	2.1	0.8	...	1.0	0.7	...	*14.6	1.0
Apr 25	1.5	0.8	...	2.0	0.6	...	*28.6	1.8
May 2	2.7	1.8	*0.0	4.1	1.0	...	*0.0	3.8
May 9	3.2	0.0	*0.0	4.4	0.9	...	*0.0	4.2
May 16	3.9	1.0	*0.0	10.4	1.6	*0.0	*0.0	8.7
May 23	2.5	2.4	*0.0	16.2	0.3	*0.0	*33.3	13.2
May 30	1.9	0.7	*0.0	12.7	0.8	*1.3	*16.7	9.9
Jun 6	3.3	1.8	*0.0	11.4	*1.4	*1.4	*13.6	9.1
Jun 13	3.6	2.2	*0.0	10.3	1.1	*7.1	*27.3	8.6
Jun 20	2.6	*2.7	*1.6	5.5	*3.2	*5.8	*0.0	4.9
Jun 27	*5.7	*4.8	*2.9	2.0	*2.9	*3.7	*27.8	2.6
Jul 4	*1.1	*0.0	3.7	1.7	*0.0	*0.0	*30.0	2.0
Jul 11	*2.0	1.9	2.9	4.0	*0.0	*0.0	*12.5	3.6
Jul 18	*0.0	*9.1	1.8	3.7	*0.0	*12.5	...	2.9
Jul 25	*9.1	*8.3	5.0	5.2	*0.0	*12.5	*50.0	5.3
Aug 1	*12.5	*8.3	4.1	9.5	*0.0	*0.0	...	6.2
Aug 8	*0.0	*11.1	7.9	14.8	*0.0	...	...	9.9
Aug 15	*25.0	*0.0	9.6	11.3	*0.0	*0.0	*33.3	10.2
Aug 22	...	*25.0	17.0	0.0	*0.0	...	*50.0	11.2
Aug 29	*0.0	*0.0	12.0	8.2	*0.0	...	*66.7	10.4
Sep 5	...	*14.3	15.4	14.2	*12.5	*0.0	*16.7	14.9
Sep 12	...	*0.0	19.7	*6.1	*0.0	...	*50.0	18.1
Sep 19	*100.0	*0.0	17.0	*0.0	*0.0	...	...	15.7
Sep 26	...	*0.0	19.0	*8.3	*0.0	...	*0.0	17.3
Oct 3	...	*0.0	21.3	*0.0	*0.0	...	*33.3	19.2
Oct 10	...	*0.0	18.6	*25.0	*0.0	...	*60.0	18.9
Oct 17	...	...	23.0	*0.0	*0.0	...	*20.0	21.4
Oct 24	...	*0.0	*10.6	*0.0	*16.7	...	*0.0	10.1
Oct 31	...	*0.0	13.1	*0.0	*6.3	..	*0.0	11.9
Total Descaled	165	43	607	4,381	82	14	150	[a]5,479
Total Examined	5,477	2,944	6,503	69,170	7,760	366	813	[a]95,050
Percent Descaled	3.0	1.5	9.3	6.3	1.1	3.8	18.4	[a]5.8

*Less than 100 fish sampled during the week.
---No fish sampled during the week
[a] Totals include some hatchery coho

Injury and Disease

Of the 23.524 smolts examined from March 28 through October 31, 3,212 fish (13.6%) exhibited some signs of disease or injury other than descaling. In general. this year's rate of injuries and diseases was significantly higher than in 1995. Injury data in 1995 was collected only from 4 April through 11 June and we observed only 621 fish (0.6%) with injuries. For the same period this year we observed 3,244 injuries (24.5% of all fish examined). The most common ailment observed during both years was gill hyperplasia, a condition caused by a nutritional deficiency that manifests as swollen or "club shaped" gills. Hatchery steelhead were the primary victims with 772 infected out of 5,703 (13.5%) examined from March through October of this year.

The second most common condition observed was predator marks. One-hundred-ninety-nine smolts had predator wounds this year. generally bird-caused V-shaped scars. In 1995. predation marks were observed on 819 smolts. The third most common injury was the presence of digenetic trematodes (digenea) in wild steelhead and yearling chinook. We observed 123 fish with this condition: 61 coho. 54 wild steelhead, six wild yearling chinook, and two wild subyearling chinook. In 1995, 111 fish were observed with digenia from April 4 through June 11. Of the various cuts, lesions and contusions suffered by fish, opercle injuries were the most frequent. This year, a total of 1,711 smolts suffered bodily injuries with 64 of those having tom opercles. Last season, we counted only120 fish with general cuts and body trauma.

Another condition that has been observed in significant numbers. and recorded as an injury, is fin hemorrhaging. Visible symptoms of this condition are characterized by pink to red coloration of the pelvic and/or anal tins. The coloration appears to be due to capillary dilation in these tissues. This condition appears to be a response to stress. We recorded this condition in 1.350 (20.9%) of all wild subyearling chinook examined. and in 212 (3.7%) of the hatchery steelhead.

Mortality

The overall facility mortality rate for fish collected at Lower Granite in 1996 was 0.13%. or 7,055 mortalities out of 5.22 7.672 fish collected Facility mortality includes fish removed from the raceways and barges or trucks before departure. sample mortalities and post sample mortalities. This is about the same as in 1995. and somewhat below the average for the last several years. although several groups of tish had higher than average mortality rates (Table 9) The combined yearling chinook mortality rate was 0.6506. The hatchery yearling chinook rate was 0.6 1 % and the wild yearling chinook mortality rate was 0.94%. The hatchery and wild steelhead mortality rates were both near 0 .05 % The combined hatchery/wild sockeye/kokanee rate \vas 3 44%, with the wild component comprising much of that percentage at 5.04%. Most of these mortalities were likely Dworshak kokanee that arrived at the facility in large numbers in late March and early April. These fish were in very poor condition and the mortality rate was quite high during that period (Table 10) We recorded only 21 dead coho which translates into a 0 11% mortality rate (See Appendix Table 3 for daily mortality by species)

The facility mortality figures include fish that perished during the NMFS tagging operation for the transport evaluation research .A total of 2,124 salmonid mortalities were removed and counted bv NMFS workers. This total includes 1,128 harchery yearling chinook. 663 wild yearling chinook. 32 I hatchery steelhead. 4 wild steelhead and 8 wild sockeye/kokanee These fish represent 30% of the total facility mortality for 1996. including 40% of the harchery yearling chinook. 56% of the wild yearling chinook and 16% of the harchery steelhead mortalities for the season

A total of 799 fsh were recorded as daily sample mortalities during the course of the season out of 101.822 fish sampled. a sample mortality rate of 0.8%. This overall sample mortality rate, as well as several species sample mortality rates. most notably wild vearling chinook wild subyearling chinook and wild and hatchery sockeye/kokanee. are somewhat higher than in the past several Fears (Table 1 I). There were no major incidents or accidents during the sampling process that resulted in unusual mortalities in 1996.

Barge mortality for barges originating at Lower Granite includes fish removed from barge holds after the barge has departed the loading dock at Lower Granite Mortalities are included from fish loaded at Lower Granite. Little Goose and Lower Monumental Total barge mortalities for I996 were 6, I27 fish. including 2.503 hatcher); yearling chinook, 849 wild yearling chinook. 7 wild subyearling chinook. 2.322 hatchery steelhead, 1 16 wild steelhead. 327 sockeye/kokanee and 3 coho So hatchery subyearling chinook mortalities were found on any of the barge trips So differentiation was made between hatchery and w ild sockeye/kokanee There were no incidents or accidents that resulted in unusual numbers of barge mortalities in 1996

The overall morality rate for fish trucked from Lower Granite Dam in 1996 was

0.39% (a total of 502 mortalities out of 126,887 trucked fish), compared to 0.23% (243,159) for 1995. This includes fish trucked prior to barging and fish trucked during the late season ending on October 31. Total mortality numbers by species were as follows: hatchery yearling chinook 27; wild yearling chinook 39; wild subyearling chinook 68; hatchery steelhead 254; wild steelhead 47; hatchery coho, zero; hatchery sockeye/kokanee, one; and wild sockeye/kokanee 86.

Two incidents, both caused by debris in orifices, resulted in mortalities. It appears that fish trapped in the turbulent gatewell slots for several hours fatigue and begin to suffer mortalities. The first incident occurred 5 May. An orifice was plugged in slot 5A. Closing the orifice and backflushing with air cleared the orifice and dead fish began appearing at the separator shortly after. An estimated 630 fish died as a result of this incident. Most of the casualties from this incident are not included in the facility mortality totals as they were removed from the separator before reaching the raceways. Another incident in which orifice debris may have caused increased mortality happened on 30 May. It is not known how many mortalities are attributable to this incident, as only a few were removed from the separator and no estimates were made in the gatewell slots.

Table 9. Annual facility mortality in percent at Lower Granite Dam, 1992-1996.

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wild Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
1992	0.6		0.4	0.3	<0.1		0.6*	0.4
1993	0.4	0.3	1.2	<0.1	<0.1		2.7*	0.1
1994	0.4	0.4	0.6	0.1	<0.1		3.0*	0.2
1995	0.3	0.2	0.4	<0.1	<0.1	0.0	1.1	0.1
1996	0.6	0.9	1.4	<0.1	<0.1	0.4	5.1	0.1**

*There was no hatchery/wild designation for sockeye/kokanee prior to 1995.
**Total for 1996 includes an annual facility mortality rate of <0.1% for coho. The inclusion of the coho does not change the total annual facility mortality rate.

Table 10. Weekly facility mortality in percent at Lower Granite Dam, 1996.

Week Ending	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wild Stcelhend	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
Apr 4	4.0	1.7	0 0	0 5	0 5	10 0	5 2	2.7
Apr I I	3.1	0.7	...	0.2	0 3	...	10 2	0.6
Apr 18	0.2	0.4	...	0.0	0 0	...	4.6	0.1
Apr 25	0.7	1.3	...	0.0	0.0	...	2.9	0.2
May2	0.5	0.8	0.2	0.0	0.0	...	1.3	<0.1
May 9	0.6	0.9	...	0.0	0.1	...	0.7	<0.1
May 16	0.6	0.9	0.0	0.0	0.0	0 0	1.3	0.1
May 23	0.3	0.3	0.0	0.0	0 0	0.0	1.0	<0 1
May 30	0.9	1.4	0.0	0.1	0.0	0 1	0 5	0.2
Jun 6	1.8	0.5	0.0	0.1	0.1	0.1	1.1	0.3
Jun I3	4.5	3.5	0 9	0 7	1 0	2 1	6 4	1 0
Jun 20	2.9	1.7	0 8	0 2	0 7	0 0	4	0 4
Jun 27	0 5	1 7	0 7	0 1	0 0	0 0	1 3	0 2
Jul 4	1.4	1 3	0 6	0 2	2 1	0 0	0 0	0 3
Jul 11	I.4	0.9	0 4	0 7	0 6	0 0	0 0	0 7
Jul 18	8.9	6.6	0.7	1 6	6 9	3 1	...	1.4
Jul25	36.5	13.5	1.7	5.6	33.3	3.1	0	4.5
Aug I	6.3	10.4	0.8	2.2	2.5	0.0	...	1.5
Aug 8	16.7	0.0	1.9	2.8	4.2	...	...	2.3
Aug 15	0.2	0.0	3.6	2.5	0 0	0.0	25.0	3 2
Aug 22	...	0.0	3.1	2	0 0	...	33 3	2 :
Aug 29	0.0	0.0	4.5	<0.1	0 0	...	0.0	2.7
Sep 5	...	0.0	2.6	0 7	5 9	0 0	0 0	2 1
Sep 12	...	0.0	2.0	0 0	0 0	...	0.0	1 7
Sep 19	0.0	0 0	0 7	0 0	0 0	...	...	1 0
Sep 76	...	0 0	2 1	0 0	0 0	...	25 0	2 1
Oct 3	...	*0.0	1.8	*0 0	*0 0	...	*0 0	1 6
Oct 10	...	0 0	10 7	0 0	0 0	...	28:6	11 0
Oct 17	...	...	4.8	0.0	0.0	0.0	0.0	4 3
Oct 24	...	0.0	4.3	0.0	0.0	...	0.0	3.6
Oct 31	...	0.0	0.0	0.0	0.0	...	0.0	0.0

---No fish collected during the week

Table II. Annual sample mortality in percent at Lower Granite Dam, 1992-1996.

Year	Hatchery Yearling Chinook	Wild Yearling Chinook	Subyearling Chinook	Hatchery Steelhead	Wild Steelhead	Hatchery Sockeye/ Kokanee	Wild Sockeye/ Kokanee	Total
1992	1.2		I.4	1.4	0.4		4.5	1.2
1993	2.2	0.3	1.7	0.2	0.2		5.5	0.5
1994	0.4	0.4	0.6	0. I	<0. 1		3.0	0.2
1995	1.0	0.9	1.1	0.3	0. I	0.0	2.7	0.6
1996	1.9	2.3	2.7	0.3	0.2	0.8	13.2	0.8*

* 1996 total include some hatchery coho

Research

This year, 12 research projects were conducted at the Lower Granite Juvenile Fish Facility The following descriptions of each project include the number of fish sacrificed or handled. We have only listed research that impacted smolt collection and sampling operations at the juvenile fish facility For the 1996 season. a total of 502 smolts were sacrificed for research. By species, these include- 409 hatchery steelhead, 73 wild steelhead and 20 hatchery coho.

NMFS Transportation Evaluation

The National Marine Fisheries Service (NMFS) PIT-tagged yearling chinook to compare survival of smolts migrating through the Snake and Columbia River hydropower system with survival of smolts transported around the dams From April I3 to June 18, NMFS tagged a total of 82.56 1 hatchery yearling chinook, 32.582 wild yearling chinook, two chinook of unknown run and rearing type and one hatchery steelhead. During this research 1,067,339 smolts were handled and not tagged: 2,86 l hatchery yearling chinook, 260 wild yearling chinook; 8,305 chinook of unknown run and rearing type; 996,385 hatchery steelhead; 58,53 l wild steelhead; 32 hatchery coho; SO hatchery sockeye/kokanee; and 885 wild sockeye/kokanee.

NMFS Survival Study

The NMFS continued its research to determine survival rates of migrating juvenile chinook and steelhead through the Snake River dams and reservoirs A total of 29,000 Lyon's Ferry hatchery fall subyearling chinook were PIT-tagged and released from mid-June to mid-July at Pittsburgh Landing (river km 336) on the Snake River and near Peck, Idaho (river km 57) on the Cleanvater River A total of 2 1,500 fish were released in the Snake and 7.500 in the Cleat-water River during this five-week period.

NMFS Surface Bypass Collector Evaluation

The NMFS PIT-tagged 15,023 hatchery steelhead collected from the juvenile fish facility from April 23 to 29 for the surface bypass collector evaluation. These fish were released in the surface collector and in the tailrace of Lower Granite Dam. No mortalities were recorded prior to release during this initial collection.

NMFS Gas Exposure Study

NMFS PIT-tagged 3.020 hatchery steelhead for use in an experimental dissolved gas exposure study. These fish were transported to Little Goose Dam where they were held in tanks with controlled amounts of gas saturation. The fish \vere then released into the Little Goose forebay. Those that entered the juvenile fish facility were separated into two groups by a PIT tag separation-by-code system with some going straight back to the river and the rest being captured, examined and placed on a transportation barge

National Biological Service Gill ATPase for Smoltification Evaluation

The National Biological Service (NBS) collected ATPase samples from 133 smolts between May 6 and May 29 to assess smolt condition in relation to travel time for the Fish Passage Center. This total included 54 hatchery yearling chinook. 55 wild yearling chinook, 17 hatchery steelhead, and seven wild steelhead. Sampling was non-lethal and all fish handled for this research were transported

National Biological Service Radio Telemetry

The NBS tracked wild fall subyearling chinook during July using radio tags *to* assess movement rates and diel activity for these fish A total of 132 subyearling chinook were tagged. 38 were handled but not tagged, and there was one monality reported during the study prior to release

Oregon State University(OSU) Evaluation of Procedures for Collection, Bypass. and Transportation

The Oregon Cooperative Fishery Research Unit radio-tagged hatchery yearling chinook collected from the wet separator to evaluate procedures for collection. bypass. and transportation of smolts. Tagged fish were transported and released below Bonneville Dam and then tracked to the estuary to examine migration behavior and survival A total of 263 hatchery yearling chinook were tagged from April **19 to** May **27** Only one fish died during the initial 24 hour recovery period.

University of Idaho Evaluation of Procedures for Transportation of .Juvenile Salmonids

The Idaho Cooperative Fishery Research Unit continued their evaluation of collection, bypass. and transportation facilities by collecting hatchery and wild smolts from facility raceways from 1 May through 35 May to evaluate physiological indices of condition. Of the 150 fish sacrificed. 77 were hatchery steelhead and 73 were wild steelhead

University of Idaho Evaluation of Effects of Descaling on Steelhead

The Idaho Cooperative Fishery Research Unit collected blood samples from healthy and descaled hatchery steelhead smolts to measure the effects of descaling on blood chemistry Of the 577 hatchery steelhead smolts collected from the sample room between 26 April to 20 May 330 were sacrificed and 245 were handled and not sacrificed. Two fish died while being held in the circular tanks for this study

U.S. Fish & Wildlife Service (USFWS) Fall Chinook Survival Study

The USFWS collected hatchery subyearling chinook from the PIT tag holding tank (diversion-by-code) and collected non-lethal gill tissue ATPase samples for their survival study. A total of 23 gill tissue samples were taken from hatchery subyearling chinook and 13 mortalities resulted from handling 167 fist during this procedure.

Gas Bubble Trauma Monitoring (WDFW/NBS)

The Washington Department of Fish and Wildlife (WDFW) and the National Biological Service (NBS) conducted Gas Bubble Trauma (GBT) examinations this season. Exams were conducted on fish collected from the wet separator three times a week during April and every-other-day from May through June in compliance with Fish Passage Center protocols. The examinations required staff to carefully inspect the unpaired tins, lateral line. and eyes on both sides of the fish with a dissecting microscope for signs of gas bubbles. Up to 100 chinook (hatchery and wild) and up to 100 steelhead (hatchery and wild). depending on the numbers of fish available, were examined each day for GBT symptoms. For the season. a total of 1.581 salmonids were examined. This total included 1.085 hatchery yearling chinook. 145 wild yearling chinook. 2,947 hatchery steelhead, and 403 wild steelhead. There were 125 fish observed with symptoms of GBT: 76 had some bubbles in the tins and 49 had lateral line occlusions. No mortalities occurred from handling during examinations.

Coho stomach content analysis (WDFW and Nez Perce Tribe)

The Washington Department of Fish and Wildlife sacrificed 20 coho for stomach content analysis. This was done in cooperation with the Nez Perce Tribe

Recommendations

1.. Modify the sample-to-truck load line to facilitate complete fish removal prior to truck departure.

2.. Place a video monitor or signal light near the anesthetist work-station to help communicate sample room readiness for anesthetized fish.

Appendix

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
03/28/9	2	10		1	10		10	31	460	46	88.5	2.	44.
03/29/9		10		3	3		0	39	460	92	87.2	0.	44.
03/30/9		20		2	17		0	67	880	1,80	81.5	0.	44.
03/31/9	1	20		11	22		0	62	980	2,78	81.1	0.	46.
04/01/9		50		10	24		0	89	1,280	4,06	81.6	0.	46.
04/02/9	1	90		60	21		0	91	1,820	5,88	80.5	7.	47.
04/03/9	1	90		99	37		0	50	1,960	7,84	93.3	14.	48.
04/04/9		80	2	1,37	51		0	41	2,390	10,23	94.4	18.	48.
04/05/9		80		2,28	49		0	26	3,110	13,34	99.5	31.	48.
04/06/9		60		2,46	54		0	26	3,320	16,66	94.4	35.	48.
04/07/9		50		1,42	35		0	18	2,000	18,66	96.6	54.	48.
04/08/9		84		1,86	38		0	14	2,472	21,13	73.4	31.	49.
04/09/9	2	164		2,36	43		0	16	3,148	24,28	90.5	48.	50.
04/10/9	4	272		6,56	1,40		0	18	8,456	32,73	118.4	59.	50.
04/11/9	6	472		11,10	2,80		0	21	14,648	47,38	134.5	69.	50.
04/12/9	12	752		8,21	3,20		0	10	12,392	59,77	152.1	69.	49.
04/13/9	16	1,080		10,02	5,50		0	4	16,800	76,57	155.7	108.	49.
04/14/9	34	2,160		18,50	6,10		0	6	27,160	103,73	147.1	112.	49.
04/15/9	50	1,300		8,90	2,30		0	25	13,250	116,98	136.5	112.	49.
04/16/9	2,15	2,775		13,07	2,80		0	15	20,950	137,93	126.7	104.	49.
04/17/9	5,02	5,400		23,05	5,87		0	40	39,750	177,68	100.6	93.	50.
04/18/9	6,40	5,100		31,50	6,20		0	15	49,350	227,03	118.8	67.	50.
04/19/9	4,50	3,800		23,50	4,70		0	10	36,600	263,63	116.4	67.	51.
04/20/9	7,65	8,250		46,30	5,25		0	5	67,500	331,13	112.6	37.	51.
04/21/9	6,70	9,000		82,60	6,00		0	30	104,600	435,73	109.9	54.	50.
04/22/9	2,50	3,700		48,50	3,10		0	10	57,900	493,63	112.6	53.	50.
04/23/9	3,50	3,300		52,60	2,50		0	10	62,000	555,63	89.9	52.	50.
04/24/9	7,80	4,400		54,20	2,90		0		69,300	624,93	118.1	48.	50.
04/25/9	9,90	6,500		154,50	8,40		0		179,300	804,23	160.1	48.	50.
04/26/9	22,40	7,700	10	279,60	14,60		0		324,400	1,128,63	142.7	46.	50.
04/27/9	13,50	4,350	30	366,90	22,35		0	15	407,550	1,536,18	134.3	51.	50.
04/28/9	9,30	1,950		175,95	15,15		0		202,350	1,738,53	131.1	46.	50.
04/29/9	16,95	2,400	15	89,40	7,20		0		116,100	1,854,63	118.1	46.	50.
04/30/9	11,85	2,100		124,05	9,75		0		147,750	2,002,38	104.0	44.	50.
05/01/9	9,60	1,500		82,80	4,95		0		98,850	2,101,23	97.2	43.	50.
05/02/9	13,65	2,700		121,95	6,15	30	0		144,750	2,245,98	99.1	43.	51.
05/03/9	17,70	1,950		125,40	5,55		0		150,600	2,396,58	99.2	29.	51.
05/04/9	18,45	1,050		145,20	5,25		0	15	170,100	2,566,68	96.4	24.	51.

05/05/9	10,20	1,500	147,45	4,50	0	163,650	2,730,33	98.7	24.	50.	

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
05/06/9	9,00	600		165,30	3,90		0		178,800	2,909,13	89.4	31.	50.
05/07/9	9,15	1,200		132,45	4,95		0		147,750	3,056,88	84.9	23.	50.
05/08/9	9,00	750		145,35	4,95		0		160,050	3,216,93	86.9	22.	50.
05/09/9	3,90	0		42,90	3,90		0		50,700	3,267,63	78.5	22.	50.
05/10/9	4,20	750		39,60	2,70		0		47,250	3,314,88	88.9	22.	50.
05/11/9	10,35	750		57,15	3,90		0		72,150	3,387,03	88.8	22.	50.
05/12/9	24,75	2,550		77,10	4,95		0		109,350	3,496,38	87.6	23.	51.
05/13/9	24,30	2,550	15	90,00	8,70		0		125,700	3,622,08	92.6	23.	50.
05/14/9	31,35	2,850		133,20	10,20		0	30	177,900	3,799,98	108.7	24.	51.
05/15/9	24,30	2,400		130,20	13,50		150		170,550	3,970,53	129.5	24.	52.
05/16/9	24,75	3,900		196,20	21,45	30	0	30	246,900	4,217,43	147.8	24.	52.
05/17/9	21,00	2,700		231,00	19,05	45	750		274,950	4,492,38	162.8	22.	50.
05/18/9	14,25	4,500		159,60	11,25	1,20	600		191,400	4,683,78	172.9	21.	50.
05/19/9	10,05	3,300		71,25	4,80	1,65	450		91,500	4,775,28	202.7	21.	50.
05/20/9	6,90	2,400		35,55	5,85	90	0		51,600	4,826,88	197.6	26.	50.
05/21/9	3,75	800		19,02	2,42	30	0		26,300	4,853,18	177.5	40.	50.
05/22/9	2,96	483		11,10	91	38	0	5	15,900	4,869,08	157.9	40.	50.
05/23/9	1,65	263	1	17,81	2,01	15	25	5	21,977	4,891,06	149.4	45.	50.
05/24/9	1,60	240		17,20	2,44	22	110	1	21,820	4,912,88	143.5	25.	51.
05/25/9	1,74	130		13,57	1,64	46	130	1	17,680	4,930,56	133.9	25.	51.
05/26/9	1,80	100		9,17	1,05	57	225		12,925	4,943,48	127.1	25.	53.
05/27/9	1,14	110	1	9,50	1,46	33	250	3	12,830	4,956,31	126.6	25.	53.
05/28/9	1,28	140		14,29	1,86	19	60	7	17,890	4,974,20	134.0	25.	55.
05/29/9	3,38	260		14,00	1,49	38	80	4	19,630	4,993,83	141.4	26.	55.
05/30/9	2,68	610		16,09	2,22	40	80	3	22,110	5,015,94	154.9	42.	54.
05/31/9	1,53	500		11,42	1,40	69	50	1	15,600	5,031,54	155.9	42.	53.
06/01/9	94	300	1	9,93	1,11	36	90	5	12,790	5,044,33	140.1	51.	53.
06/02/9	1,07	400		6,47	75	70	75	5	9,525	5,053,86	142.0	64.	53.
06/03/9	75	300	1	5,71	66	38	30	2	7,860	5,061,72	134.8	64.	53.
06/04/9	88	330		9,24	92	42	220	5	12,060	5,073,78	147.5	74.	57.
06/05/9	98	370		9,25	86	68	200	5	12,390	5,086,17	168.4	100.	57.
06/06/9	98	320		8,83	56	68	110	3	11,510	5,097,68	187.5	100.	57.
06/07/9	1,09	560	2	13,78	1,17	1,13	50	6	17,860	5,115,54	187.3	107.	55.
06/08/9	78	330	3	11,57	98	85	110	3	14,680	5,130,22	183.5	92.	56.
06/09/9	65	175	5	8,05	92	82	75	2	10,775	5,140,99	190.2	92.	56.
06/10/9	38	390	3	5,30	43	54	160	2	7,250	5,148,24	201.1	76.	57.
06/11/9	45	210	4	4,85	41	56	150		6,670	5,154,91	203.5	59.	56.
06/12/9	22	210	4	3,22	23	36	100		4,380	5,159,29	194.6	59.	57.

06/13/9	34	280	11	2,19	14	30	110	2	3,490	5,162,78	185.2	58.	57.
06/14/9	14	230	11	1,92	6	10	30	3	2,620	5,165,40	175.4	55.	57.

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
06/15/9	12	70	6	1,47	12	21	150		2,200	5,167,60	168.8	55.	58.
06/16/9	9	80	7	1,59	9	11	60		2,090	5,169,69	173.4	46.	59.
06/17/9	6	56	1	2,15	10	14	64		2,608	5,172,30	161.7	44.	59.
06/18/9	7	40	2	1,44	6	8	36		1,780	5,174,08	168.1	44.	59.
06/19/9	11	20	4	1,68	5	25	56		2,240	5,176,32	161.6	45.	59.
06/20/9	8	40	7	79	4	13	24		1,200	5,177,52	140.3	45.	57.
06/21/9	6	44	3	62	1	16	12	2	968	5,178,49	130.8	45.	57.
06/22/9	3	36	4	1,46	4	13	24		1,788	5,180,28	104.2	54.	57.
06/23/9	1	4	1	37	1	3	12	2	476	5,180,75	99.9	60.	58.
06/24/9	2	28	5	56	2	6	16		776	5,181,53	91.4	60.	59.
06/25/9	2	20	4	58	2	8	24		808	5,182,34	91.6	45.	58.
06/26/9	2	24	5	47		7	16	1	692	5,183,03	95.7	44.	58.
06/27/9	3	16	5	55	1	9	4		776	5,183,81	92.2	44.	59.
06/28/9		12	6	67	1	3	20		836	5,184,64	93.8	44.	59.
06/29/9	4	32	14	1,32	1	6	16		1,652	5,186,29	94.1	43.	59.
06/30/9	8	36	13	1,57	2	3	8		1,896	5,188,19	84.1	43.	60.
07/01/9	5	16	8	1,29	1	7	8		1,556	5,189,75	75.7	55.	62.
07/02/9	7	32	23	1,66		4	4		2,064	5,191,81	76.6	71.	62.
07/03/9	5	16	12	1,06		6	4	1	1,344	5,193,15	87.6	71.	63.
07/04/9	3	8	8	81	1	3	12		992	5,194,15	87.9	72.	63.
07/05/9	6	12	12	72	1	1	0		952	5,195,10	79.7	69.	64.
07/06/9	1	88	10	1,17	2	2	4		1,440	5,196,54	81.0	69.	64.
07/07/9	2	76	26	1,25	4	3	0		1,696	5,198,23	74.0	76.	64.
07/08/9	1	140	25	98	2	4	8		1,472	5,199,71	62.3	83.	65.
07/09/9	1	92	14	1,16	2	1	0		1,456	5,201,16	64.1	83.	66.
07/10/9	3	28	44	1,14	1	2	0	1	1,708	5,202,87	59.7	87.	66.
07/11/9	4	8	33	68	1	1	4		1,100	5,203,97	49.9	77.	66.
07/12/9	2	40	45	41	1	2	8		984	5,204,95	52.5	77.	67.
07/13/9	3	32	1,04	58	2	1	8		1,744	5,206,70	53.8	72.	68.
07/14/9		24	54	75		1	8		1,356	5,208,05	53.7	72.	68.
07/15/9	1	0	43	66		2	4		1,148	5,209,20	49.5	72.	68.
07/16/9	1	24	40	56	1	2	0		1,040	5,210,24	47.4	62.	68.
07/17/9		4	27	38			4		692	5,210,93	56.1	71.	68.
07/18/9	2	12	24	34		1	0		652	5,211,59	53.8	71.	68.
07/19/9	1	0	30	33			0		652	5,212,24	49.4	72.	68.
07/20/9		16	20	23			4		468	5,212,71	47.3	70.	68.
07/21/9		0	13	12			0		264	5,212,97	44.6	70.	68.
07/22/9		0	17	21			4		412	5,213,38	44.5	68.	68.

07/23/9	12	28	28		8	592	5,2 13,97	41.3	52.	69.
07/24/9	16	25	33		8	616	5,214,59	42.6	52.	69.

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
07/25/9		8	28	40			8		720	5,215,31	41.3	59.	69.
07/26/9		16	39	27	1		0		708	5,216,02	42.3	31.	69.
07/27/9		4	40	21			0		640	5,216,66	40.5	31.	70.
07/28/9		4	34	22			0		580	5,217,24	38.3	30.	70.
07/29/9		0	28	10			0		396	5,217,63	38.9	18.	70.
07/30/9		8	36	25			0		632	5,218,27	39.9	18.	70.
07/31/9		8	36	30			4		692	5,218,96	38.4	20.	71.
08/01/9	1	8	33	17			0		532	5,219,49	36.0	36.	70.
08/02/9		0	18	21			0		404	5,219,89	38.0	36.	70.
08/03/9		8	28	13	1		0		440	5,220,33	38.0	30.	69.
08/04/9		4	36	14			0		524	5,220,86	41.7	27.	69.
08/05/9		0	29	12			0		412	5,221,27	37.5	27.	69.
08/06/9		16	28	10			0		404	5,221,67	35.8	11.	69.
08/07/9		0	25	10			0		360	5,222,03	36.9	0.	68.
08/08/9		8	33	6			0		416	5,222,45	35.7	1.	68.
08/09/9		1	20	7			0		297	5,222,75	34.2	5.	68.
08/10/9		1	11	9			1		212	5,222,96	34.7	10.	68.
08/11/9		3	9	9			0		197	5,223,16	35.5	13.	68.
08/12/9		0	10	7			0		182	5,223,34	32.7	25.	68.
08/13/9		0	11	6			1		190	5,223,53	32.8	17.	68.
08/14/9		0	8	9			0		179	5,223,71	32.2	19.	68.
08/15/9		0	6	7			0		143	5,223,85	35.9	9.	69.
08/16/9		2	5	7			0		140	5,223,99	38.1	0.	69.
08/17/9		0	10	9			0		207	5,224,20	43.4	0.	69.
08/18/9		1	7	8			0		164	5,224,36	40.2	2.	69.
08/19/9		0	8	5			0		140	5,224,50	40.2	0.	68.
08/20/9		0	8	3			0		121	5,224,62	40.3	0.	66.
08/21/9		0	9	5			0		149	5,224,77	39.1	0.	64.
08/22/9		1	8	3			0		129	5,224,90	37.8	0.	64.
08/23/9		0	7	2			0		106	5,225,01	41.5	0.	66.
08/24/9		0	6	5			0		127	5,225,13	38.2	0.	65.
08/25/9		0	7	7			0		151	5,225,28	38.5	0.	65.
08/26/9		1	4	4			0		87	5,225,37	34.4	0.	65.
08/27/9		0	2	2			0		53	5,225,42	38.8	0.	64.
08/28/9		0	3	2			0		67	5,225,49	38.7	0.	64.
08/29/9		0	4	2			0		71	5,225,56	38.7	0.	64.
08/30/9		0	6	1			0		85	5,225,65	40.5	0.	64.
08/31/9		0	4	3			0		74	5,225,72	40.7	0.	62.

09/01/9	0	3	3	74	5,225,79	42.0	0.	62.
09/02/9	0	2	2	50	5,225,84	29.0	0.	64.

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
09/03/9		1	2	1			0		49	5,225,89	24.5	0.	64.
09/04/9		4	2				0		39	5,225,93	24.3	0.	64.
09/05/9		2	5	1			1		68	5,226,00	24.9	0.	62.
09/06/9		1	3				0		45	5,226,05	24.9	0.	62.
09/07/9		0	3				0		41	5,226,09	26.3	0.	64.
09/08/9		0	3				0		40	5,226,13	25.3	0.	64.
09/09/9		0	3				0		39	5,226,17	24.7	0.	64.
09/10/9		0	2				0		29	5,226,19	25.0	0.	64.
09/11/9		0	4				0		48	5,226,24	25.2	0.	64.
09/12/9		0	3				0		45	5,226,29	22.5	0.	64.
09/13/9		1	6				0		77	5,226,36	14.4	0.	64.
09/14/9		2	2				0		26	5,226,39	15.2	0.	64.
09/15/9		0	4				0		53	5,226,44	17.9	0.	64.
09/16/9		0	2				0		29	5,226,47	17.8	0.	64.
09/17/9		0	3				0		33	5,226,51	16.3	0.	64.
09/18/9		0	2				0		31	5,226,54	24.6	0.	65.
09/19/9		0	4				0		53	5,226,59	28.5	0.	65.
09/20/9		1	6				0		66	5,226,66	26.8	0.	64.
09/21/9		5	7	1			0		92	5,226,75	28.4	0.	64.
09/22/9		0	6				0		69	5,226,82	29.4	0.	64.
09/23/9		0	6				0		63	5,226,88	24.6	0.	64.
09/24/9		2	1				0		23	5,226,90	28.7	0.	64.
09/25/9		2	4				0		50	5,226,95	26.6	0.	63.
09/26/9		0	1				0		20	5,226,97	25.8	0.	63.
09/27/9		0	2				0		33	5,227,01	27.0	0.	63
09/28/9		1	1				0		21	5,227,03	25.5	0.	63.
09/29/9		0	3				0		37	5,227,06	29.0	0.	63.
09/30/9		0	3				0		37	5,227,10	24.4	0.	62.
10/01/9		0	2				0		22	5,227,12	22.8	0.	62.
10/02/9		1	2				0		21	5,227,14	26.3	0.	62.
10/03/9		0	1				0		19	5,227,16	23.4	0.	62.
10/04/9		0	1				0		19	5,227,18	26.4	0.	62.
10/05/9		2	2				0		27	5,227,21	22.3	0.	62.
10/06/9		0	2				0		32	5,227,24	24.5	0.	62.
10/07/9		1	3				0		38	5,227,28	24.0	0.	62.
10/08/9		0	1				0		16	5,227,29	23.8	0.	62.
10/09/9		0	1				0		22	5,227,32	25.0	0.	62.
10/10/9		0	1				0		18	5,227,33	25.3	0.	62.

10/11/9	0	0	21	5,227,36	24.3	0.	62.
10/12/9	0	0	13	5,227,37	26.2	0.	62.

Table 1: Daily total collection, and daily average flows, spill and temperature at LGR, 1996

	Hatcher Yearlin Chinoo	Wild Yearling Chinook	Wil Subyrlin Chinoo	Hatcher Steelhea	Wil Steelhea	Hatcher Coh	Hatchery Sockeye	Wil Sockey	Daily Total	Cumulativ Tota	Flows (kcfs)	Spil (kcfs	Tem (F
10/13/9		0	1				0		22	5,227,39	24.2	0.	62.
10/14/9		0	1				0		17	5,227,41	22.0	0.	62.
10/15/9		0	1				0		17	5,227,42	22.7	0.	62.
10/16/9		0	1				0		19	5,227,44	21.3	0.	61.
10/17/9		0					0		8	5,227,45	21.0	0.	60.
10/18/9		0					0		9	5,227,46	26.4	0.	59.
10/19/9		0	2				0		25	5,227,49	26.8	0.	59.
10/20/9		0					0		7	5,227,49	23.8	0.	59.
10/21/9		0	1				0		18	5,227,51	17.3	0.	59.
10/22/9		0					0		3	5,227,51	19.9	0.	59.
10/23/9		0	1				0		12	5,227,53	16.8	0.	58.
10/24/9		1					0		8	5,227,53	19.3	0.	56.
10/25/9		0					0		8	5,227,54	18.8	0.	56.
10/26/9		0					0		4	5,227,55	20.3	0.	55.
10/27/9		1					0		7	5,227,55	18.3	0.	54.
10/28/9		0	1				0		17	5,227,57	19.0	0.	53.
10/29/9		0	1				0		19	5,227,59	19.4	0.	53.
10/30/9		0	1				0		14	5,227,60	18.8	0.	52.
10/31/9		1	5		1		0		65	5,227,67	18.3	0.	52.
Total	462,99	126,894	17,34	4,264,68	321,82	19,02	5,136	9,76	5,227,671				

Appendix, continued

Table 2: Daily bypass totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
03/28/96	0	0	0	0	0	0	0	0	0
03/29/96	0	0	0	0	0	0	0	0	0
03/30/96	0	0	0	0	0	0	0	0	0
03/31/96	0	0	0	0	0	0	0	0	0
04/01/96	0	0	0	0	0	0	0	0	0
04/02/96	0	0	0	0	0	0	0	0	0
04/03/96	0	0	0	0	0	0	0	0	0
04/04/96	0	0	0	0	0	0	0	0	0
04/05/96	0	0	0	0	0	0	0	0	0
04/06/96	0	0	0	0	0	0	0	0	0
04/07/96	0	0	0	0	0	0	0	0	0
04/08/96	0	11	0	0	0	0	0	0	11
04/09/96	4	23	0	0	0	0	0	0	27
04/10/96	6	39	0	0	0	0	0	0	45
04/11/96	6	69	0	0	0	0	0	0	75
04/12/96	15	102	0	0	0	0	0	0	117
04/13/96	0	0	0	0	0	0	0	0	0
04/14/96	31	127	0	0	0	0	0	0	158
04/15/96	35	177	0	0	0	0	0	0	212
04/16/96	71	350	0	0	0	0	0	0	421
04/17/96	210	750	0	0	0	0	0	0	960
04/18/96	461	1065	0	0	0	0	0	0	1,526
04/19/96	426	767	0	0	0	0	0	0	1,193
04/20/96	357	1199	0	0	0	0	0	0	1,556
04/21/96	610	1920	0	0	0	0	0	0	2,530
04/22/96	435	1317	0	0	0	0	0	0	1,752
04/23/96	452	706	0	0	0	0	0	0	1,158
04/24/96	951	827	0	0	0	0	0	0	1,778
04/25/96	1,659	1276	0	0	0	0	0	0	2,935
04/26/96	1,355	978	0	0	0	0	0	0	2,333
04/27/96	1,447	723	0	0	0	0	0	0	2,170
04/28/96	676	368	0	0	0	0	0	0	1,044
04/29/96	1,516	332	0	0	0	0	0	0	1,848
04/30/96	2,307	468	0	0	0	0	0	0	2,775
05/01/96	1,000	135	0	0	0	0	0	0	1,135

Table 2: Daily bypass totals

Table 3: Daily facility mortality totals

Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
2	0	0	2	0	0	1	8	13
0	0	0	3	2	0	0	31	36
0	1	0	0	0	0	0	20	21
0	0	0	0	0	0	0	70	70
0	0	0	0	0	0	0	18	18
0	4	0	0	0	0	0	34	38
0	0	0	3	1	0	0	21	25
0	1	0	7	7	0	0	43	58
0	1	0	8	0	0	0	22	31
0	2	0	17	8	0	0	24	51
0	0	0	1	0	0	0	12	13
0	2	0	3	1	0	0	13	19
0	0	0	1	0	0	0	14	15
3	3	0	12	7	0	0	38	63
1	0	0	8	3	0	0	20	32
12	19	0	12	1	0	0	23	67
0	1	0	5	0	0	0	9	15
0	3	0	10	0	0	0	5	18
2	9	0	5	0	0	0	1	17
2	5	0	1	1	0	0	4	13
6	15	0	5	2	0	0	4	32
6	30	0	1	0	0	0	7	44
9	52	0	9	1	0	0	3	74
18	30	0	8	3	0	0	4	63
51	39	0	17	0	0	0	11	118
35	158	0	16	3	0	0	1	213
38	102	0	26	1	0	0	0	167
57	50	0	36	0	0	0	0	143
122	85	0	105	2	0	0	0	314
114	47	0	53	0	0	0	0	214
68	52	1	25	0	0	0	2	148
63	39	0	36	2	0	0	0	140
50	19	0	18	3	0	0	0	90
70	15	0	12	0	0	0	0	97
82	9	0	11	0	0	0	0	102

Table 3: Daily facility mortality totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
05/02/96	1,261	201	0	0	0	0	0	0	1,462
05/03/96	2,224	395	0	0	0	0	0	0	2,619
05/04/96	1,755	241	0	0	0	0	0	0	1,996
05/05/96	1,183	162	0	0	0	0	0	0	1,345
05/06/96	2,090	276	0	0	0	0	0	0	2,366
05/07/96	2,147	182	0	0	0	0	0	0	2,329
05/08/96	1,259	177	0	0	0	0	0	0	1,436
05/09/96	167	0	0	0	0	0	0	0	167
05/10/96	1,245	237	0	0	0	0	0	0	1,482
05/11/96	2,701	383	0	0	0	0	0	0	3,084
05/12/96	3,952	320	0	0	0	0	0	0	4,272
05/13/96	3,773	634	0	0	0	0	0	0	4,407
05/14/96	2,682	189	0	0	0	0	0	0	2,871
05/15/96	1,374	116	0	0	0	0	0	0	1,490
05/16/96	1,363	104	0	0	0	0	0	0	1,467
05/17/96	787	114	0	0	0	0	0	0	901
05/18/96	512	98	0	0	0	0	0	0	610
05/19/96	2,087	716	0	0	0	0	0	0	2,803
05/20/96	1,053	269	0	0	0	0	0	0	1,322
05/21/96	305	138	0	0	0	0	0	0	443
05/22/96	71	8	0	0	0	0	0	0	79
05/23/96	70	11	0	0	0	0	0	0	81
05/24/96	77	10	0	0	0	0	0	0	87
05/25/96	78	12	0	0	0	0	0	0	90
05/26/96	0	0	0	0	0	0	0	0	0
05/27/96	52	7	0	750	0	0	0	0	809
05/28/96	66	6	0	0	0	0	0	0	72
05/29/96	187	18	0	746	0	0	0	0	951
05/30/96	147	35	0	0	0	0	0	0	182
05/31/96	75	34	0	0	0	0	0	0	109
06/01/96	50	16	0	764	0	0	0	0	830
06/02/96	0	0	0	0	0	0	0	0	0
06/03/96	42	13	0	0	0	0	0	0	55
06/04/96	43	16	0	0	0	0	0	0	59
06/05/96	47	23	0	760	0	0	0	0	830
06/06/96	48	18	0	0	0	0	0	0	66

Table 2: Daily bypass totals

Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
64	8	0	19	0	0	0	0	91
119	10	0	37	0	0	0	0	166
44	10	0	9	2	0	0	1	66
50	17	0	25	0	0	0	0	92
112	16	0	102	17	0	0	0	247
17	1	0	18	0	0	0	0	36
66	11	0	30	1	0	0	0	108
80	0	0	30	0	0	0	0	110
37	14	0	21	0	0	0	0	72
74	8	0	35	0	0	0	0	117
153	25	0	35	1	0	0	0	214
121	14	0	14	0	0	0	0	149
195	24	0	58	3	0	0	2	282
152	41	0	119	8	0	0	0	320
62	11	0	40	4	0	0	6	123
52	10	0	25	2	0	0	0	89
42	9	0	47	4	0	0	0	102
29	3	0	38	2	0	0	0	72
34	9	0	22	1	0	0	0	66
12	3	0	52	2	0	0	0	69
18	4	0	16	0	2	0	0	40
10	1	0	7	0	0	0	1	19
0	0	0	4	0	0	1	0	5
7	0	0	4	1	0	0	0	12
2	1	0	1	0	0	0	0	4
10	0	0	11	0	0	0	1	22
9	0	0	2	0	0	0	0	11
17	0	0	5	0	0	0	0	22
84	22	0	28	3	0	0	0	137
40	4	0	7	1	0	1	0	53
27	3	0	10	1	0	0	2	43
12	1	0	5	0	0	0	0	18
17	0	0	8	1	0	0	0	26
6	1	0	6	0	0	0	0	13
13	2	0	17	1	0	0	0	33
14	1	0	15	1	0	0	1	32

Table 3: Daily facility mortality totals

Hatch	Wild	Wild

	Yrlng Chin	Yrlng Chin	Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
06/07/96	61	29	0	0	0	0	0	0	90
06/08/96	718	297	26	9,979	845	733	95	26	12,719
06/09/96	0	0	0	0	0	0	0	0	0
06/10/96	17	11	0	0	0	0	0	0	28
06/11/96	20	14	0	0	0	0	0	0	34
06/12/96	10	11	0	0	0	0	0	0	21
06/13/96	18	13	0	0	0	0	0	0	31
06/14/96	8	12	0	0	0	0	0	0	20
06/15/96	5	5	0	0	0	0	0	0	10
06/16/96	0	0	0	0	0	0	0	0	0
06/17/96	8	8	0	0	0	0	0	0	16
06/18/96	11	4	0	0	0	0	0	0	15
06/19/96	0	0	0	0	0	0	0	0	0
06/20/96	0	0	0	0	0	0	0	0	0
06/21/96	0	0	0	0	0	0	0	0	0
06/22/96	0	0	0	0	0	0	0	0	0
06/23/96	0	0	0	0	0	0	0	0	0
06/24/96	0	0	0	0	0	0	0	0	0
06/25/96	0	0	0	0	0	0	0	0	0
06/26/96	0	0	0	0	0	0	0	0	0
06/27/96	0	0	0	0	0	0	0	0	0
06/28/96	0	0	0	0	0	0	0	0	0
06/29/96	0	0	0	0	0	0	0	0	0
06/30/96	0	0	0	0	0	0	0	0	0
07/01/96	0	0	0	0	0	0	0	0	0
07/02/96	0	0	0	0	0	0	0	0	0
07/03/96	0	0	0	0	0	0	0	0	0
07/04/96	0	0	0	0	0	0	0	0	0
07/05/96	99	20	200	1,529	28	32	12	4	1,924
07/06/96	0	0	0	0	0	0	0	0	0
07/07/96	0	0	0	0	0	0	0	0	0
07/08/96	0	0	0	0	0	0	0	0	0
07/09/96	0	0	0	0	0	0	0	0	0
07/10/96	0	0	0	0	0	0	0	0	0
07/11/96	0	0	0	0	0	0	0	0	0
07/12/96	0	0	0	0	0	0	0	0	0

Table 2: Daily bypass totals

Yrlng Chin	Yrlng Chin	Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
38	13	0	69	8	2	0	1	131
17	7	0	19	3	1	5	4	56
14	7	0	19	4	5	3	1	53
16	17	1	17	1	1	4	4	61
20	15	0	20	2	5	1	0	63
27	4	0	68	10	0	1	0	110
42	12	2	111	13	1	2	0	183
6	4	0	11	0	0	0	0	21
9	3	1	7	0	0	0	0	20
3	0	1	1	0	0	0	0	5
0	0	0	0	2	0	0	1	3
1	1	0	1	0	0	0	1	4
0	1	0	0	2	0	0	0	3
1	0	1	1	0	0	0	0	3
0	1	0	1	0	2	0	0	4
0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
0	0	0	1	0	0	0	0	1
0	1	0	0	0	0	0	0	1
0	0	2	3	0	0	0	1	6
0	0	0	2	1	0	0	0	3
0	0	3	6	0	0	0	0	9
1	2	0	3	0	0	0	0	6
2	0	1	1	0	0	0	0	4
0	0	1	0	0	0	0	0	1
2	0	0	3	1	0	0	0	6
0	0	0	4	0	0	0	0	4
1	0	0	3	0	0	0	0	4
0	0	0	3	0	0	0	0	3
0	2	3	4	1	1	0	0	11
1	0	2	5	0	0	0	0	8
1	1	0	9	0	0	0	0	11
0	1	2	17	0	0	0	0	20
0	0	0	8	0	0	0	0	8
1	0	4	7	0	0	0	0	12

Table 3: Daily facility mortality totals

Hatch Yrlng	Wild Yrlng	Wild Yrlng	Hatch	Wild	Hatch	Hatch	Wild

	Chin	Chin	Chin	Sthd	Sthd	Coho	Sock	Sock	Total
07/13/96	0	0	0	0	0	0	0	0	0
07/14/96	0	0	0	0	0	0	0	0	0
07/15/96	0	0	0	0	0	0	0	0	0
07/16/96	0	0	25	0	0	0	0	0	25
07/17/96	0	0	0	0	0	0	0	0	0
07/18/96	0	0	0	0	0	0	0	0	0
07/19/96	0	0	0	0	0	0	0	0	0
07/20/96	0	0	9	0	0	0	0	0	9
07/21/96	0	0	0	0	0	0	0	0	0
07/22/96	0	0	18	0	0	0	0	0	18
07/23/96	0	0	0	0	0	0	0	0	0
07/24/96	0	0	20	0	0	0	0	0	20
07/25/96	0	0	0	0	0	0	0	0	0
07/26/96	0	0	0	0	0	0	0	0	0
07/27/96	0	0	20	0	0	0	0	0	20
07/28/96	0	0	0	0	0	0	0	0	0
07/29/96	0	0	0	0	0	0	0	0	0
07/30/96	0	0	20	0	0	0	0	0	20
07/31/96	0	0	0	0	0	0	0	0	0
08/01/96	0	0	0	0	0	0	0	0	0
08/02/96	0	0	20	0	0	0	0	0	20
08/03/96	0	0	0	0	0	0	0	0	0
08/04/96	0	0	0	0	0	0	0	0	0
08/05/96	0	0	0	0	0	0	0	0	0
08/06/96	0	0	0	0	0	0	0	0	0
08/07/96	0	0	0	0	0	0	0	0	0
08/08/96	0	0	0	0	0	0	0	0	0
08/09/96	0	0	0	0	0	0	0	0	0
08/10/96	0	0	0	0	0	0	0	0	0
08/11/96	0	0	0	89	3	0	0	0	92
08/12/96	0	0	0	75	3	0	0	0	78
08/13/96	0	0	0	63	4	0	0	0	67
08/14/96	0	0	0	89	1	0	0	0	90
08/15/96	0	0	0	74	2	0	0	0	76
08/16/96	0	0	0	77	2	0	0	0	79
08/17/96	0	0	0	95	3	0	0	0	98

Table 2: Daily bypass totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
07/13/96	0	2	4	4	0	0	0	0	10
07/14/96	0	1	3	4	1	0	0	0	9
07/15/96	5	3	6	10	1	1	1	0	27
07/16/96	0	3	2	12	0	0	0	0	17
07/17/96	4	0	4	10	3	0	0	0	21
07/18/96	1	0	2	12	0	0	0	0	15
07/19/96	4	1	4	23	2	0	0	0	34
07/20/96	3	2	2	14	0	0	0	0	21
07/21/96	3	0	0	8	2	0	0	0	13
07/22/96	1	0	7	19	0	0	0	0	27
07/23/96	6	0	13	19	0	0	0	0	38
07/24/96	1	1	1	6	0	0	0	0	9
07/25/96	1	3	1	19	0	0	1	0	25
07/26/96	0	1	6	3	0	0	0	0	10
07/27/96	1	3	1	10	0	0	0	0	15
07/28/96	1	0	2	3	0	0	0	0	6
07/29/96	0	0	1	4	0	0	0	0	5
07/30/96	0	1	3	4	0	0	0	0	8
07/31/96	0	0	5	8	1	0	0	0	14
08/01/96	0	0	3	2	0	0	0	0	5
08/02/96	1	0	13	7	0	0	0	0	21
08/03/96	0	0	4	4	0	0	0	0	8
08/04/96	0	0	12	7	0	0	0	0	19
08/05/96	0	0	6	2	0	0	0	0	8
08/06/96	0	0	1	2	0	0	0	0	3
08/07/96	1	0	2	0	1	0	0	0	4
08/08/96	0	0	1	3	0	0	0	0	4
08/09/96	0	0	7	7	0	0	0	0	14
08/10/96	0	0	3	0	0	0	0	0	3
08/11/96	0	0	2	2	0	0	0	0	4
08/12/96	0	0	1	0	0	0	0	0	1
08/13/96	0	0	6	3	0	0	0	0	9
08/14/96	1	0	2	1	0	0	0	0	4
08/15/96	0	0	8	1	0	0	0	1	10
08/16/96	0	0	2	2	0	0	0	0	4
08/17/96	0	0	4	4	0	0	0	0	8

Table 3: Daily facility mortality totals

08/18/96	0	0	0	83	1	0	0	0	84
08/19/96	0	0	0	53	2	0	0	0	55
08/20/96	0	0	0	38	2	0	0	0	40
08/21/96	0	0	0	53	0	0	0	0	53
08/22/96	0	0	0	38	2	0	0	0	40
08/23/96	0	0	0	27	2	0	0	0	29
08/24/96	0	0	0	55	2	0	0	0	57
08/25/96	0	0	0	70	4	0	0	0	74
08/26/96	0	0	0	42	2	0	0	0	44
08/27/96	0	0	0	27	0	0	0	0	27
08/28/96	0	0	0	26	2	0	0	0	28
08/29/96	0	0	0	22	0	0	0	0	22
08/30/96	0	0	0	14	0	0	0	0	14
08/31/96	0	0	0	30	0	0	0	0	30
09/01/96	0	0	0	34	2	0	0	0	36
09/02/96	0	0	0	23	3	0	0	0	26
09/03/96	0	0	0	19	3	0	0	0	22
09/04/96	0	0	0	4	4	0	0	0	8
09/05/96	0	0	0	10	4	0	0	0	14
09/06/96	0	0	0	6	0	0	0	0	6
09/07/96	0	0	0	3	0	0	0	0	3
09/08/96	0	0	0	4	0	0	0	0	4
09/09/96	0	0	0	5	0	0	0	0	5
09/10/96	0	0	0	4	0	0	0	0	4
09/11/96	0	0	0	4	2	0	0	0	6
09/12/96	0	0	0	7	0	0	0	0	7
09/13/96	0	0	0	7	1	0	0	0	8
09/14/96	0	0	0	1	0	0	0	0	1
09/15/96	0	0	0	3	2	0	0	0	5
09/16/96	0	0	0	1	1	0	0	0	2
09/17/96	0	0	0	0	0	0	0	0	0
09/18/96	0	0	0	1	2	0	0	0	3
09/19/96	0	0	0	3	1	0	0	0	4
09/20/96	0	0	0	3	0	0	0	0	3
09/21/96	0	0	0	11	1	0	0	0	12
09/22/96	0	0	0	6	0	0	0	0	6

Table 2: Daily bypass totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
09/23/96	0	0	0	1	0	0	0	0	1

0	0	2	1	0	0	0	0	3
0	0	5	1	0	0	0	0	6
0	0	2	0	0	0	0	0	2
0	0	3	0	0	0	0	0	3
0	0	0	1	0	0	0	1	2
0	0	2	0	0	0	0	0	2
0	0	5	0	0	0	0	0	5
0	0	1	1	0	0	0	0	2
0	0	1	0	0	0	0	0	1
0	0	1	0	0	0	0	0	1
0	0	2	0	0	0	0	0	2
0	0	5	0	0	0	0	0	5
0	0	3	1	0	0	0	0	4
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	1
0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	3	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	3	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	1
0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	1
0	0	1	0	0	1	0	0	2
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	2	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0

Table 3. Daily facility mortality totals

Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
0	0	1	0	0	0	0	0	1

09/24/96	0	0	0	2	1	0	0	0	3
09/25/96	0	0	0	1	2	0	0	0	3
09/26/96	0	0	0	0	1	0	0	0	1
09/27/96	0	0	0	4	5	0	0	0	9
09/28/96	0	0	0	1	1	0	0	0	2
09/29/96	0	0	0	3	0	0	0	0	3
09/30/96	0	0	0	1	0	0	0	0	1
10/01/96	0	0	0	0	0	0	0	0	0
10/02/96	0	0	0	0	0	0	0	0	0
10/03/96	0	0	0	2	0	0	0	0	2
10/04/96	0	0	0	0	0	0	0	0	0
10/05/96	0	0	0	0	1	0	0	0	1
10/06/96	0	0	0	1	1	0	0	0	2
10/07/96	0	0	0	1	0	0	0	0	1
10/08/96	0	0	0	1	0	0	0	0	1
10/09/96	0	0	0	1	2	0	0	0	3
10/10/96	0	0	0	0	1	0	0	0	1
10/11/96	0	0	0	0	0	0	0	0	0
10/12/96	0	0	0	0	0	0	0	0	0
10/13/96	0	0	0	1	1	0	0	0	2
10/14/96	0	0	0	1	0	0	0	0	1
10/15/96	0	0	0	1	1	0	0	0	2
10/16/96	0	0	0	0	1	0	0	0	1
10/17/96	0	0	0	0	1	0	0	0	1
10/18/96	0	0	0	0	0	0	0	0	0
10/19/96	0	0	0	0	3	0	0	0	3
10/20/96	0	0	0	1	0	0	0	0	1
10/21/96	0	0	0	2	2	0	0	0	4
10/22/96	0	0	0	0	0	0	0	0	0
10/23/96	0	0	0	0	0	0	0	0	0
10/24/96	0	0	0	1	1	0	0	0	2
10/25/96	0	0	0	2	1	0	0	0	3
10/26/96	0	0	0	0	0	0	0	0	0
10/27/96	0	0	0	0	0	0	0	0	0
10/28/96	0	0	0	1	3	0	0	0	4

Table 2: Daily bypass totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
10/29/96	0	0	0	1	1	0	0	0	2
10/30/96	0	0	0	1	1	0	0	0	2

09/24/96	0	0	1	0	0	0	0	0	1
09/25/96	0	0	1	0	0	0	0	1	2
09/26/96	0	0	2	0	0	0	0	0	2
09/27/96	0	0	0	0	0	0	0	0	0
09/28/96	0	0	0	0	0	0	0	0	0
09/29/96	0	0	3	0	0	0	0	0	3
09/30/96	0	0	0	0	0	0	0	0	0
10/01/96	0	0	0	0	0	0	0	0	0
10/02/96	0	0	0	0	0	0	0	0	0
10/03/96	0	0	0	0	0	0	0	0	0
10/04/96	0	0	0	0	0	0	0	1	1
10/05/96	0	0	0	0	0	0	0	0	0
10/06/96	0	0	1	0	0	0	0	0	1
10/07/96	0	0	13	0	0	0	0	1	14
10/08/96	0	0	1	0	0	0	0	0	1
10/09/96	0	0	0	0	0	0	0	0	0
10/10/96	0	0	1	0	0	1	0	0	2
10/11/96	0	0	2	0	0	0	0	0	2
10/12/96	0	0	0	0	0	0	0	0	0
10/13/96	0	0	3	0	0	0	0	0	3
10/14/96	0	0	0	0	0	0	0	0	0
10/15/96	0	0	0	0	0	0	0	0	0
10/16/96	0	0	0	0	0	0	0	0	0
10/17/96	0	0	0	0	0	0	0	0	0
10/18/96	0	0	0	0	0	0	0	0	0
10/19/96	0	0	0	0	0	0	0	0	0
10/20/96	0	0	0	0	0	0	0	0	0
10/21/96	0	0	0	0	0	0	0	0	0
10/22/96	0	0	1	0	0	0	0	0	1
10/23/96	0	0	2	0	0	0	0	0	2
10/24/96	0	0	0	0	0	0	0	0	0
10/25/96	0	0	0	0	0	0	0	0	0
10/26/96	0	0	0	0	0	0	0	0	0
10/27/96	0	0	0	0	0	0	0	0	0
10/28/96	0	0	0	0	0	0	0	0	0

Table 3: Daily facility mortality totals

	Hatch Yrlng Chin	Wild Yrlng Chin	Wild Yrlng Chin	Hatch Sthd	Wild Sthd	Hatch Coho	Hatch Sock	Wild Sock	Total
10/29/96	0	0	0	0	0	0	0	0	0
10/30/96	0	0	0	0	0	0	0	0	0

10/31/96	0	0	0	2	10	0	0	0	12	0	0	0	0	0	0	0	0	0
Totals	49,978	9,332	358	15,860	977	765	107	30	87,407	2,850	1,191	246	2,066	164	23	21	494	7,055
%										0.61	0.94	1.42	0 05	0.05	0.12	0.41	5.06	0.13